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Super-Production On Super Sixes

New Britain Six Spindle Screw Machines

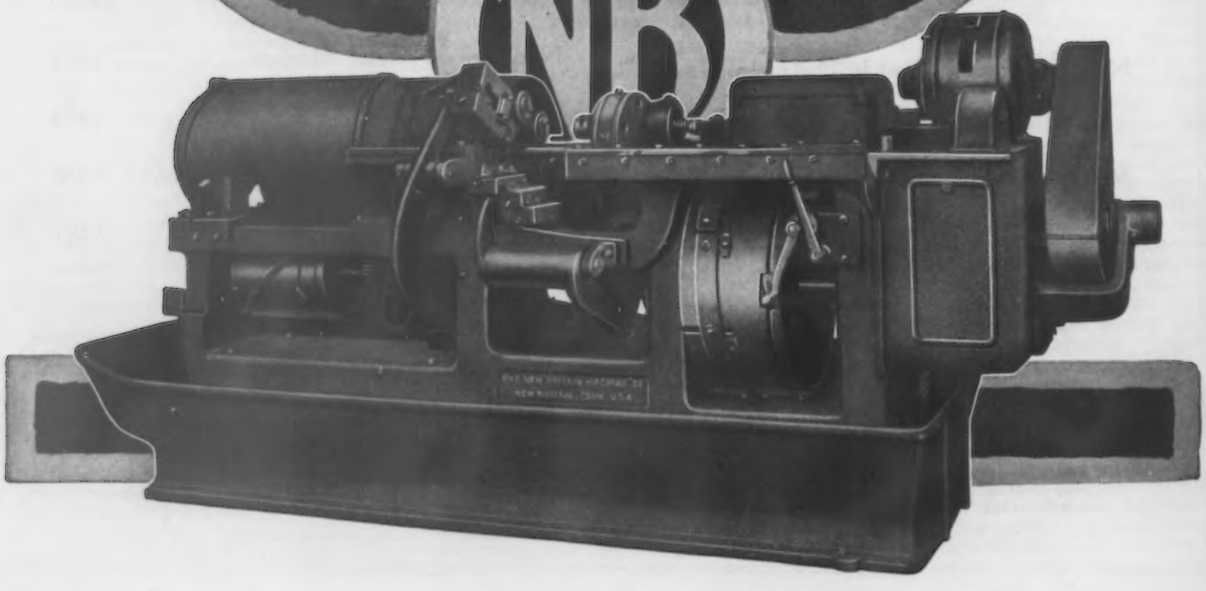
Four Sizes --- 5/8 in. 1 in. 1 5/8 in. 1 3/4 in.

Six spindle positions and four or five cross slide positions enable splitting of long operations and consequent increased production. Six tool slide positions also permit accelerated finishing tools, both reaming and external, with consequent improvement in accuracy and finish of product.

High spindle speeds, rugged construction, and simplicity of camming are selling these machines to Production Managers who demand largest output per dollar of investment, who cannot submit to interruption of down time, and where simplicity of operation is an important consideration.

These Super-Sixes are the result of fifteen years experience in customers' plants

NEW BRITAIN NB



THE IRON AGE

New York, December 6, 1928

ESTABLISHED 1855 VOL. 122, No. 23

Simple Control of 52,000 Parts

Cash Register Company Solves Problem of Regulating Stock and Retaining Its Production Economies

BY BURNHAM FINNEY*

RAW and finished stocks of the National Cash Register Co., Dayton, Ohio, are controlled so that the amount on hand does not greatly exceed, and yet fully meets, the demands of production. This is done by means of a simple method, although 52,000 parts go into the company's product and many of them are used in such small numbers compared with the output of the equipment in which they are made that frequent and expensive machine set-ups are required. The problem of stock control, therefore, is complicated by the need for an economical volume of output, in keeping with the investment and set-up costs.

About 42,000 parts are produced in the company's plant and the remaining 10,000 are bought. Excluding machinery and other plant equipment, approximately 98 per cent of the raw materials and finished parts purchased by the company is carried in stock regularly. Material is controlled principally through a stock ordering department, which is under the supervision of the factory superintendent responsible for production. Inspectors, on the other hand, report to the engineering department, which is directly responsible to the management. This arrangement eliminates any sympathetic connection between the inspectors and the production department and insures impartial and rigid inspection.

*Resident editor of THE IRON AGE, at Cincinnati.

Procedure in Bringing Out New Machine

Before a new part or a new machine goes into production, the future demands committee must decide that it is warranted to meet the needs of a particular line of business. Information regarding the function of the machine is then turned over to the invention department, which makes up models to be examined for mechanical defects and for betterment of efficiency by the register

Advantages Attributed to Simplified Stock Control System Used by National Cash Register Co.

1. *Only material that is actually in demand by operating departments is stored in the stock rooms.*

2. *All costs entering into the manufacture of parts are tabulated and are available soon after each operation has been completed.*

3. *Production officials can locate the position of an order within a few minutes.*

4. *Duplication of records has been avoided, reducing overhead expenses.*

5. *Inventories of raw and finished stock are determined with comparative ease, in spite of the large volume of material on hand.*

6. *The system has contributed substantially to lower operating costs and has increased the efficiency of the company's production division.*

examination committee. The supervisor of assembling is chairman of this committee which consists of the chief engineer, factory superintendent, chief inspector, a representative of the sales department and various department heads responsible for the tooling, etc.

After the machine passes the register examining committee, prints are sent to the planning committee, the chairman of which is the foreman of the tool designing department. Other members of the committee are the foremen of departments that may have operations on parts making up the machine. This committee decides whether permanent or temporary tools should be made, the kind of tools that are necessary, the type of machine on which parts are to be machined, the time required to make the design of the tools and the due date for the completion of the tools. The committee also prepares a list of the sequence of operations through which the parts are to pass. This information is incorporated in a report called the "planning department list," which is sent to all departments having operations on any part of the machine. A copy also goes to the stock ordering department, which gets from it the following essential data: (1) name of the part, (2) raw material from which the part is made, (3) number of parts obtained from a strip or bar of stock, (4) departments in sequence of machine operations, (5) number of each part per register. Incidentally, the stock ordering department generally knows how many machines are to be built in a given period, how much raw stock will be required, the date for the completion of tools and the date for completion of the machines.

Two Weeks' Stock Surplus Carried

The stock ordering department is responsible for material from the time it is ordered through the purchasing department until it is delivered to the assembly department. In ordering stock the department proceeds on the basis of maintaining a two weeks' surplus to guard against tieups of manufacturing because of temporary interruptions in the receipt of goods. The surplus also enables the operating departments to increase production beyond normal rates for a limited time.

Instead of maintaining elaborate records requiring numerous clerks, 28 forms suffice to trace material as it moves through the factory and to provide a complete inventory of raw and finished goods. Use of these forms has so simplified the system of controlling material in stock and in process that handling 52,000 parts is only slightly more complicated than the problem of the average metal-working plant.

Master Sheet for Raw Stocks

Form No. 1 is a master sheet for raw stocks and is a record of the purchased material in stock. It is filed in the stock ordering department as a perpetual inventory. Every item has a number which appears at the top of this form. Entry of receipts is made from form No. 5, (receiving department's report of goods received) and entry of quantity specified on production orders is taken from form No. 15 (work order). Under the column heading, "drawn by," is put the letter of the department drawing the stock. The quantities delivered are entered from form No. 10 (requisition form) and form No. 15, and the amounts delivered are deducted from the quantity in stock.

Form No. 1 also shows the price per unit and the average price per unit. The unit price is obtained from the seller's invoice. At the top right hand corner of the form is listed the monthly usage. These figures are put down in pencil and every six months are transferred to the usage column on the main part of the form card.

Form No. 1 is the only record of raw materials, since none is kept in the stock rooms. When a new item is ordered, the stock ordering department sends a note to the stock room where the item is to be stored requesting its entry in the stock room's index and arrangements for its storage in a compartment. The index gives the location and number of all material in the stock room, and raw items received at the plant are quickly dispatched to the stock room and placed in the compartment assigned.

How New Stock Is Ordered

When the figures in the "quantity in stock" column of form No. 1 show that the stock has been reduced to the

Form No. 1 Is a Master Sheet for Raw Stocks and Is Filed in the Stock Ordering Department as a Perpetual Inventory. It is the only record of raw materials, since none is kept in the stockrooms

2461

Name and Specification Cold Drawn Screw Steel - Round - Bessemer .356" to .359" x 6' to 8'

Specification #35-C (SAMPLE)

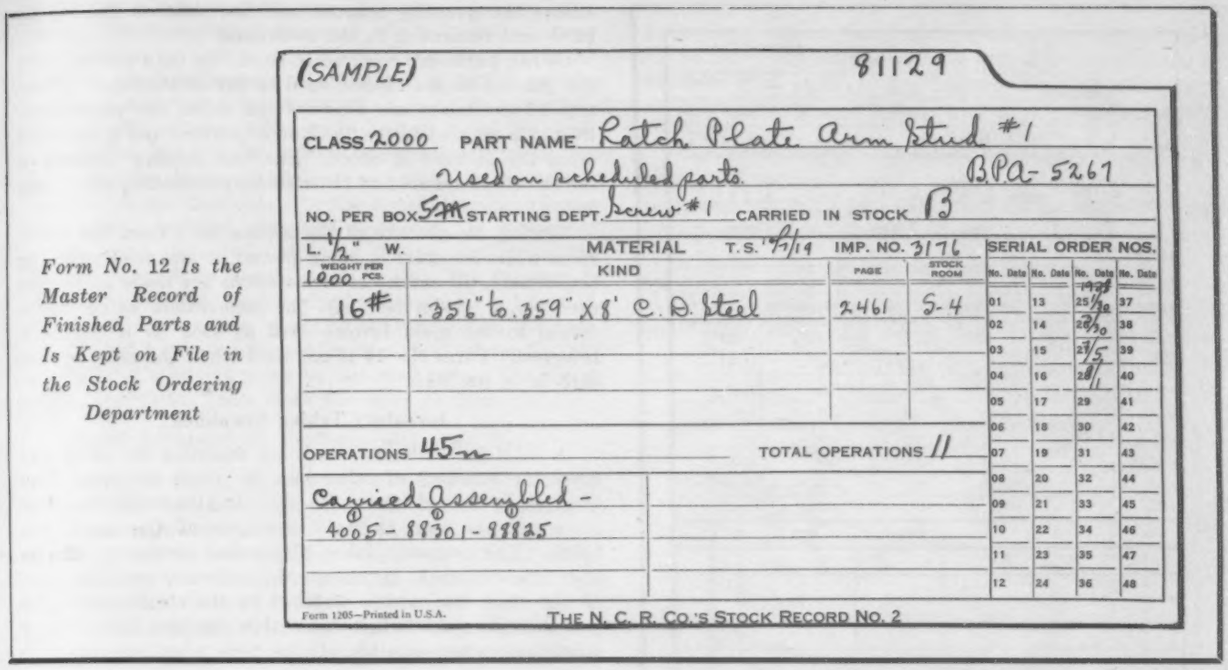
Average Usage 350-9-7-9 Contract with from to Material Class No. 170

Monthly Order Limit Min. 1000# Max. 2000# Wt. Per 8' = 2.76# Stock Room S #4 Invoiced 7-12-28 Standard Price .0365 Priced by # Carried by #

	1928		1928
Jan.	33	July	412
Feb.	786	Aug.	66
March	0	Sept.	
April	520	Oct.	
May	0	Nov.	
June	465	Dec.	
TOTAL	1804	TOTAL	

Form 1175—E—Printed in U. S. A.

DATE 1928	ORDERED QUANTITY	ORD. NO.	DUE DATE	ORDERED IN	DATE RUSHED	RECEIVED	ORDER NO	PRICE PER UNIT	SPECIFIED ON PRODUCTION ORDERS DATE	QUANTITY	ORDER NO.	DUE DATE	DATE DELVD	COLOR	DRAWN BY	DELIV'D	QUANTITY IN STOCK	AVERAGE PRICE PER UNIT	MONTHLY ACCUMULATED USAGE
6 30	1000#	15		#1				.039	7/5	400	8112927	8/30	7/9				580	.039	
									25	120	2686328	9/5	8/17						
7 9									9/11	400	8112928	10/15				402	178		402
12/30	1/1											Invoice					168		412
						1258	15	.041									1426	.041	
7 27						54	Ret. Accum. Stock								32		1480		-54
8 17																120	1360		66
9 4				#1 1/2		8	Ret. Accum. Stock								32		1368		- 8
9 7	1000#	16		#8											400				



(SAMPLE) 81129

CLASS 2000 PART NAME Ratch. Plate Arm Stud #1
used on scheduled parts. B.P.A- 5267

NO. PER BOX 5M STARTING DEPT. Screw #1 CARRIED IN STOCK B

L. 1/2" W. MATERIAL T.S. 1/1/19 IMP. NO. 3176

WEIGHT PER 1000 PCS.	KIND	PAGE	STOCK ROOM
16#	.356" to .359" X 8' C.D. Steel	2461	S-4

SERIAL ORDER NOS.

No.	Date	No.	Date	No.	Date	No.	Date
01		13		25	1/28	37	
02		14		26	2/20	38	
03		15		27	3/5	39	
04		16		28	3/11	40	
05		17		29		41	
06		18		30		42	
07		19		31		43	
08		20		32		44	
09		21		33		45	
10		22		34		46	
11		23		35		47	
12		24		36		48	

OPERATIONS 45m TOTAL OPERATIONS 11

Carried Assembled -
4005 - 88301 - 99825

Form 1205—Printed in U.S.A. THE N. C. R. CO.'S STOCK RECORD NO. 2

Form No. 12 Is the Master Record of Finished Parts and Is Kept on File in the Stock Ordering Department

ordering limit, the clerk in the stock ordering department issues a requisition, form No. 2, for the purchase of additional material. The order numbers are made up by taking the part number indicated on the record and adding to it "01", "02", "03", etc. Copies of the requisition go to the purchasing, comptroller's, receiving and research departments. The research department gets a copy in order to test the stock for proper specifications when it is received. A copy also goes to the seller.

When a purchase of stock amounts to $500 or more, the stock clerk makes out form No. 3 which, with form No. 2, is turned over to the buyer in the purchasing department, who lists the prices of various competitors and his recommendation. All correspondence is attached. This form must be approved by the purchasing agent before the purchase is made, and it then is filed in the purchasing department.

When any department is in need of goods not carried in stock, it issues a special purchase requisition. Copies of this requisition go to the purchasing department, comptroller, receiving department and test department, while another copy constitutes the seller's order. The name of the seller is not filled in by the purchasing department until the requisition has been approved by the supervisor of the department asking for the material, the head of the division, the comptroller and the stock ordering department. Requisitions are numbered consecutively as received in the purchasing department.

Procedure of Receiving Material

When goods arrive at the receiving department, the receiving clerk opens the package, pulls from his files the copy of the order (form No. 2 or No. 4), counts or weighs the material and fills in a "report of goods received," identified as form No. 5. The comptroller's department uses a copy of this report to check the invoice from the seller. Another copy is sent to the stock ordering department, where the stock clerk enters the amount on form No. 1 as a credit on the order. Copies go to the comptroller's department, stock ordering department, purchasing department and the department receiving the goods. Another copy is sent first to the inspection department, second to the stock department and third to the comptroller's department, while a copy is retained by the receiving department. Through this report the stock ordering department gets its first information about the receipt of raw stock.

All material received at the plant passes from the receiving department to the inspection department. If the inspector rejects any of the goods, the information is recorded on a "notice of rejected goods report," copies of which go to the stock ordering department, chief inspector, comptroller, receiving department, inspection department's file, purchasing agent, stock room to which accepted goods are dispatched, and test department. A ninth copy passes to the stock ordering department and thence to the buyer in the purchasing department who placed the order.

Unused Material Disposed of in Six Months

Raw material that has not been required in six months is investigated to determine what should be done with it, in order to eliminate from stock items which may not be called for again. If the decision is to sell the material, where practical it is immediately removed from the bins and turned over to the purchasing department. Accompanying the material is an "order to sell material," listing its condition, approximate value, location and reason for selling. The purchasing department, comptroller, receiving department and the department issuing the order receive copies. Incidentally this order, designated as form No. 7, is also used by departments when requesting the purchasing department to sell scrap or waste material.

Much the same procedure is followed in disposing of finished stock. When the stockkeeper has had no requisition for an item in six months, he sends to the department formerly using the material a "disposition sheet," or form No. 28, on which he asks why there has been no demand. If use of the part has been abandoned, the disposition sheet then goes to the repair department to find out whether it is advisable to hold any stock for repairs. The sheet is returned to the stockkeeper, who writes his recommendations for disposal of the stock. Before material is disposed of approval of the head of the stock division must be given.

Record of Finished Parts Similar

As form No. 1 is the master record of raw stocks, form No. 12 is the master control record of finished parts. This form is kept on file in the stock ordering department, the order numbers originating in the same manner as on

Stock Carried by B Required Stock by (SAMPLE)

Used on 2000 4 Bk Fixture 100 9 Asmbl Bk

No. Used: Class 1 2 Class 2 Class 2 Class 3 Class

Name 2000 Latch Plate Arm Stud #1

Invoiced 8-15 1928 Bin No. 259513 B.P. No. A5267

Page 81129 Low C-22000 R. W. 5500

Pattern No.

Operations

Started by Total Opers. No. Per Box

1928	1928	192	192	1927	1927
Unn. 11739	JULY 13000	JAN.	JULY	JAN.	JULY
FEB. 13250	AUG. 8878	FEB.	AUG.	FEB.	AUG.
MAR. 7549	SEP.	MAR.	SEP.	MAR.	SEP.
APR. 3193	OCT.	APR.	OCT.	APR.	OCT.
MAY 5400	NOV.	MAY	NOV.	MAY	NOV.
JUNE 13200	DEC.	JUNE	DEC.	JUNE	DEC.
TTL 47436	TTL.	TTL.	TTL.	TTL 49723	TTL 38652

Date	Ordered	Received	Delivered	In Stock	By	Ck. No.
7 5	25000	8/30	(9000)			
7 26	10000					
7 26	15000 due 8/30					
8 31	15000					
8 31	10000 due 8/30					
9 1	25000 - 10/15		(11000)			

MEMOS

used on scheduled parts

Carried Assem - 4005 - 89301 - 89875

Form 1312—Printed in U. S. A. THE N. C. R. CO'S INVOICE CARD NO. 1

Invoice Card No. 1 for Manufactured Parts, Identified as Form No. 13, Is Filed in a Galvanized Iron Pocket on the Stock Bin in the Stockroom. It is the only record of issues and withdrawals. When more stock is to be ordered, it is sent to the stock ordering department and during its absence information is kept temporarily on invoice card No. 2 (form No. 14)

form No. 1. All essential data, such as the part name, number of parts in each stock box, department in which first operation is done, kind of material necessary and number of operations, are listed. On the back of the form is recorded the usage of the part for six-month periods, also the type of machine on which the part is used and the number per machine.

Invoice Card Avoids Complicated Filing

Invoice card No. 1 for manufactured parts, identified as form No. 13, is filed in a galvanized iron pocket on the stock bin in the stockroom. It gives detailed information about the part and is the only record of the issues and withdrawals, thus eliminating duplication of filing and a large amount of detail work. On parts being machined the time allowed for the various operations or the due date for the completion of the part is arrived at by taking into consideration the number and kind of operations on the part and the condition of the departments in which the operations are performed. Two weeks are added to the time allowed for performing operations to take care of any unusual condition in the manufacturing departments. When the stock in the stockroom and on order diminishes to the "low limit," the invoice card is sent to the clerk in the stock ordering department, who places an order and enters the quantity ordered and due date on the invoice card, and returns it to the stockroom.

When parts are received in stock, the date and quantity are entered on the invoice card by the stockkeeper. When any of the parts are drawn from stock, the amount delivered is entered in the "delivered" column and is deducted from the amount in stock. The "by number" column is for the check number of the stockkeeper making the transaction.

During the absence of the invoice card from the stockroom while an order is being placed by the stock ordering department, all entries of transactions are made on invoice card No. 2 (form No. 14), the memoranda being transferred to the main invoice card as soon as it has been returned. Form No. 14 is not used when the main invoice card is in its bin.

Inventory Taking Simplified

A label for each raw stock bin describes the stock and gives the numbers of other bins in which the same kind of stock is carried (form No. 8). It also shows the date on which the last physical inventory of the stock was taken. The company takes a physical inventory of raw and finished stock at six-month intervals, and the date on the stock bin card is watched by the stockkeeper, who sees that the stock is invoiced within the time limit, taking advantage when possible of the time when the stock is

Form 878—(1)—Printed in U.S.A.

This form made out by Stock Department

Goes 1st to Making Department; 2d to Stockkeeper; 3d to Stock Department; 4th to Comptroller's

AVER. MONTHLY USAGE	DUE DATE	ORDER NO.
12000	10/15	8112928

PART NAME Used On Sched Parts
2000 Latch Plate Arm Stud #1 Bp A5267
(SAMPLE)

QUANTITY ORDERED	NUMBER PER BOX	BIN NUMBER
25000	5000	B-259513
FIRST OPER. 45U	NUMBER OF OPER. 11	NUMBER OF DEPTS.

To Screw #1 Department 9/1/28 19

MATERIAL REQUIRED
400# .356" to .359" x 8' CDSS (B8)
Stock S 2461

Page No.

DATE REQUISITIONED	LOCATE AT MACHINE NO.	FOREMAN

Upon presentation of this order stockkeeper will deliver material required

DATE DEL'D	QUANTITY	WEIGHT

The N. C. R. Co. Stock Production Order No. 1

Making Dept. Requisition

CHARGE NO.
PRICE
TOTAL COST

Manufacturing Departments Schedule Work to Conform to Due Dates Specified on an Order, and Stock Production Order No. 1, Called Form No. 15, Is a Sample of Such an Order. Attached to this form is a tracing and cost sheet giving the location of stock, cost of labor and materials and other items, and serving as a record from which annual inventory of work in process is taken

lowest. The inventory furnishes a check on the accuracy of the figures on invoice card No. 1 (form No. 13).

When the stockkeeper is asked for a report on the amount of any particular material on hand in the stockroom, he fills out form No. 9, and sends it to the stock order clerk. When a department needs material from the stockroom, the foreman fills out and signs a requisition, form No. 10, and forwards it to the stockkeeper, who issues the required material and then forwards the requisition to the order clerk, who deducts the amount from the quantity in stock on record form No. 1. The foreman is required to give the use for which the material is intended. If a department returns goods to the stockroom, the foreman fills out a "stock returned credit ticket" (form No. 11) and sends it with the stock to the stockroom. The ticket is then sent to the order clerk for entry on form No. 1.

Work Scheduled to Conform with Due Dates

All manufacturing departments schedule their work to conform with the due dates specified on the order, and stock production order No. 1, called form No. 15, is a sample of such an order. When invoice card No. 1 (form No. 13) is sent to the stock ordering department to have additional stock ordered, the order clerk gets from it and from the master control record (form No. 12) the necessary information to fill out stock production order No. 1. One copy goes to the making department for requisition purposes, a second to the same department to be filed and a third to the stockkeeper. When the making department is ready to start work on the order, the presentation of the requisition copy to the stockkeeper is his instruction to deliver the quantity of stock called for. He then enters the date and quantity delivered on the requisition and forwards it to the stock order clerk, who enters it under "delivery" on form No. 1 and deducts the amount delivered from the quantity in stock.

Record of Costs Is Kept

Accompanying form No. 15 is a "tracing and cost sheet," on which is kept the record of the location of each box of stock in the factory. Information regarding labor costs is got from a copy of the piece-work or day-work labor ticket, known as form No. 23, which is filled out by the clerk of the department upon the completion of the operation on each order and is sent to the stock ordering department. There the department that has had the stock is credited and the department to which it is delivered is charged with it, entries being made on the cost sheet of form No. 15. The data on the tracing and cost sheet give the location of stock, prevent duplication of payment to workmen, and serve as a record from which the annual inventory of work in process is taken. As a result of this system the cost sheet is kept up-to-date constantly and is never more than 5 hr. behind the actual work. The figures include the cost of labor, of materials and of other items entering into the manufacture of the part. When inventory time arrives, the total value of the work in process may readily be computed from these sheets.

Stock Card Follows Work Through Plant

Accompanying each box of stock through the factory is a stock card, form No. 16, really constituting the production order after the first operation, as form No. 15 goes only to the department performing the first operation. The stock card contains the part and order number, name of part, quantity ordered, number per box, truck or box numbers, date ordered and the date the part must be completed. As it progresses with the work through the factory, the quantity of parts processed, the date of finishing the work and the workmen's check number are listed. When a department has completed its operation, the foreman charges the material in the box to the next department having work on that stock. The foreman gets this information from the price and record cards which are on file in each department. An accurate check is kept on the stock card, as the material accompanying it is inspected at intervals for quality and quantity as it goes through the factory.

Standard work or tote boxes are used throughout the plant, and material travels through all operations in the same box. The box number is entered on the time ticket by the department performing the first operation.

Procedure on Rush Orders

When the stock on hand is reduced to the "right-of-way" limit, which is a two or four weeks' supply, depending upon the length of time necessary to manufacture that particular part, a right-of-way order is made out. The right-of-way man locates the stock in process by checking form No. 15 for the last operation performed and attaches to the stock card a red sticker marked "right-of-way" (form No. 16), indicating a preferred order. If the situation is acute on account of the finished stock being practically exhausted, a yellow sticker marked "special No. 1" is put on the stock card, the yellow sticker superseding the red. "Special No. 1" is for stock going into the main assembly departments and for a similar emergency in stock for sub-assembly departments a "special No. 2" green sticker is used. For identification purposes tickets corresponding in color and meaning to the stickers just described are placed in the pockets of stock boxes in

Form 213 Printed in U. S. A.

ORDER FOR 2000 STOCK — 10/15 (SAMPLE)

PART AND ORDER NUMBER	CARD NO.	NO. OF OPER.	TRUCK OR BOX NOS.	BOX WT. LBS.	BOX WT. OZ.
911928	1	11			

NAME OF PART: Latch Plate Arm Stud #1

B.P. A 5261

QUANTITY ORDERED	NUMBER PER BOX	DATE ORDERED
25000	5000	9/1/28

OPER. NO. & DEPT. LET.	QUAN. PARTS ORDERED	DATE FIN. WORK MO.	DATE FIN. WORK DA.	WORKMAN'S CHECK NUMBER	OPER. NO. & DEPT. LET.	QUAN. PARTS ORDERED	DATE WR. FIN. MO.	DATE WR. FIN. DA.	WORKMAN'S CHECK NUMBER
45m									

used on Scheduled Parts

Monthly Usage 12000 Bin No. B-259-13

Accompanying Each Box of Stock Through the Factory Is a Stock Card, Form No. 16, Which Really Constitutes the Production Order After the First Operation

the factory, the tickets indicating to the foreman, tracers and others concerned the importance of the stock.

When the stock in the stockroom is entirely exhausted, a holding ticket is placed in a pocket on the stock bin, which is a notification to the stockkeeper putting away stock that there is a requisition being held for a quantity of the part. Requisitions that cannot be filled because of stock exhaustion are filed in a central location in the stockroom and are filled immediately when the stock is received.

Whenever it becomes necessary to send stock through the factory ahead of the regular schedule to which it has been assigned, a special "sent-ahead" requisition is used to speed delivery of the material.

Converting Core Ovens to Gas Heating

Ease of Change and Benefits Accruing Stressed in Description of the Revamped Equipment

BY JOHN F. LANGNER*

CORE baking, an essential operation in foundry practice, is still in a state of evolution. This vital process is far from being perfected, but progress toward this end has been accelerated of late years. The essential phase of core baking is the application of heat, and here much of the profits of many foundries is swallowed. The correct fuel properly applied is the answer to this knotty problem. But, while most foundrymen recognize this, they do not seem to know what the correct fuel is nor how to apply it.

Until recently one of the largest boiler foundries in the Middle West used the raw fuel, coke. It was cheap and its use was traditional. But lack of control was a bug-a-bear which cost many rejected charges that had been spoiled by either over or underbaking.

Recently the coke-fired core ovens were converted to use gas as a fuel. The only changes necessary were to block off the ports, at the bottom of the oven, which led from the coke combustion chamber and to place gas burners on the floor of the oven, along each side.

Prior to the conversion the foundry output had so increased that it had been decided to install more ovens. But this was found to be unnecessary, as the use of gas increased the production of the existing units beyond the present needs.

*Industrial gas engineer, Northern Indiana Public Service Co.

Naturally the increased production meant less labor, fuel, time, space and equipment cost. Close temperature control was made possible and through this item rejections and spoiled production were largely eliminated.

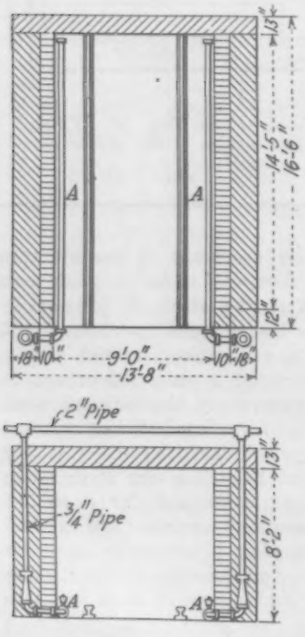
Furthermore, atmospheric control was attained by the use of gas—a considerable accomplishment when it is considered that a distinctly oxidizing atmosphere is a requisite in good core baking. By proportioning the gas-air mixture, before it is fired through the burner, a reducing, neutral or oxidizing atmosphere is obtained at will. In this case the latter is desired.

EXPERIMENTAL DATA ON 15 HEATS IN CORE OVENS WITHOUT INSULATION

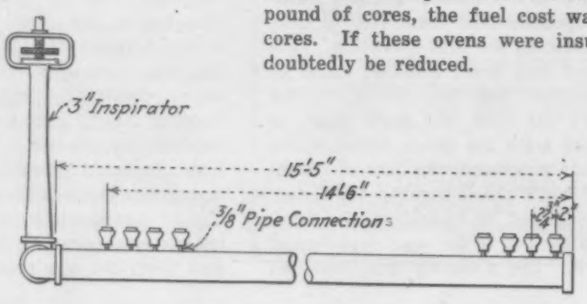
Approximate Weight of Dry Cores, Lb.	Gas Used, Cu. Ft.	Operating Time Hr.	Operating Time Min.	Gas per Lb. of Cores, Cu. Ft.
5,862	7,722	5	40	1.33
3,365	7,253	6	10	2.15
6,049	7,235	5	0	1.19
6,798	8,811	7	0	1.29
6,445	7,289	11	55	1.13
6,258	7,336	6	35	1.17
2,788	4,359	6	50	1.56
6,258	6,539	5	55	1.04
3,397	4,045	4	0	1.02
5,798	7,110	6	20	1.22
1,621	3,324	4	0	2.04
3,012	7,170	4	45	2.38
2,648	4,029	3	50	1.52
5,256	7,289	5	0	1.38
3,926	3,551	3	40	0.90
69.481	93,042			Average 1.34

Inside dimensions of the oven are 9 ft. wide, 14½ ft. deep and 8 ft. high. It has two high-pressure Surface Combustion Co. gas inspirators, which feed into two horizontal manifolds, one on each side. The sketch shows the burner assembly in detail. The manifold consists of a 3-in. standard pipe on which 1-in. lava-tip burners, 62 in number, are spaced 2½ in. apart and fired as indicated.

Cores made here are of an oil sand mixture, the ratio being one part of oil to 54 parts of sand by volume, and they vary from 1 to 350 lb., dry weight. A test of 15 heats gave an average of 1.34 cu. ft. gas for each pound of baked cores. At 70c. per M cu. ft. of gas, and 1.34 cu. ft. per pound of cores, the fuel cost was $1.876 per ton of dried cores. If these ovens were insulated this cost could undoubtedly be reduced.



Two Sections of Remodeled Core Oven of Car Type: Horizontal Section Above; Vertical, Below. At A A are shown the burner lines for gas



Arrangement of Gas Burner Line, with Burners at 2¾-In. Intervals from Inspirator to Far End

Short Conveyors in Making Trucks

Handling Heavy Pieces from Machine to Machine on Rollers or by Monorail—Devices Used in Assembling

BY FRED L. PRENTISS*

POWER conveyors for progressive assembling of motor truck chasses were recently installed by the White Motor Co., Cleveland. Although the efficiency of the use of conveying equipment for assembling trucks was questioned, the results have proved satisfactory, in that the chasses are assembled more quickly and at reduced cost. Considerable handling of material has been eliminated and the production department is able to do planning better than under the old method of assembling.

The problems faced in laying out the assembly department with power conveyors were more complex in many ways than those involved in building assembly lines for passenger automobiles. On the latter a large volume of cars of one model are turned out. The White company makes 12 distinct truck models on one assembly unit, and in addition there are many departures from the standard designs.

Another important recent change in the methods of this company which has proved of great advantage has to do with the finished stock. Formerly the company built standard trucks for stock and at times accumulated large stocks. Then much of the truck equipment had to be changed to meet the specifications of the customer. This led the company to discontinue building standard trucks for stock. Instead a stock is built up of standard parts comprising the more important units. A motor is built complete except as to certain parts for which substitution may be made to suit the buyer. Transmissions for the heavier types of cars are built up with various gear ratios, so the purchaser can have without delay the gear ratio he wants. Sleeves are left off the rear axle, permitting these to be assembled with different gear ratios. There are calls from buyers for different types of magnetos and for different motors. With the new method of building up parts that are standardized the buyers' specifications can be quickly complied with by the addition to these standard parts of such parts as are not completely standardized.

As a result of this innovation, the stock is kept in finished machine parts and sub-assemblies or partial sub-assemblies, instead of in finished trucks. This makes the

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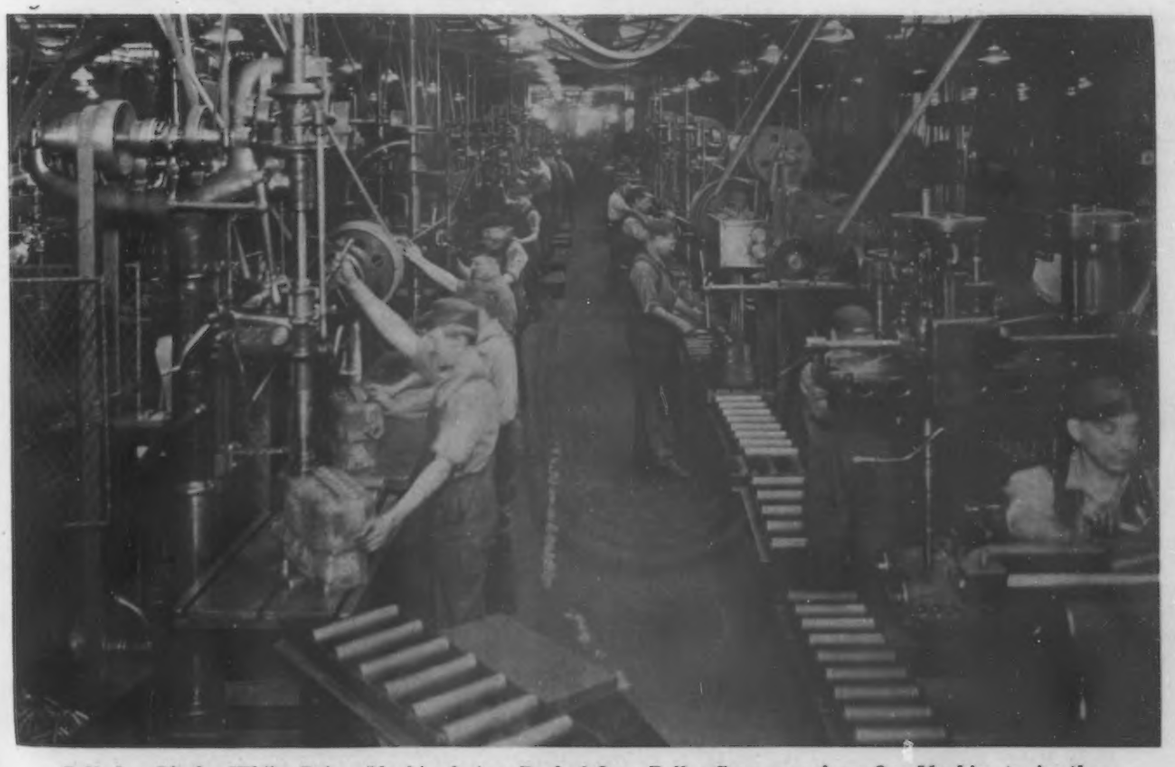
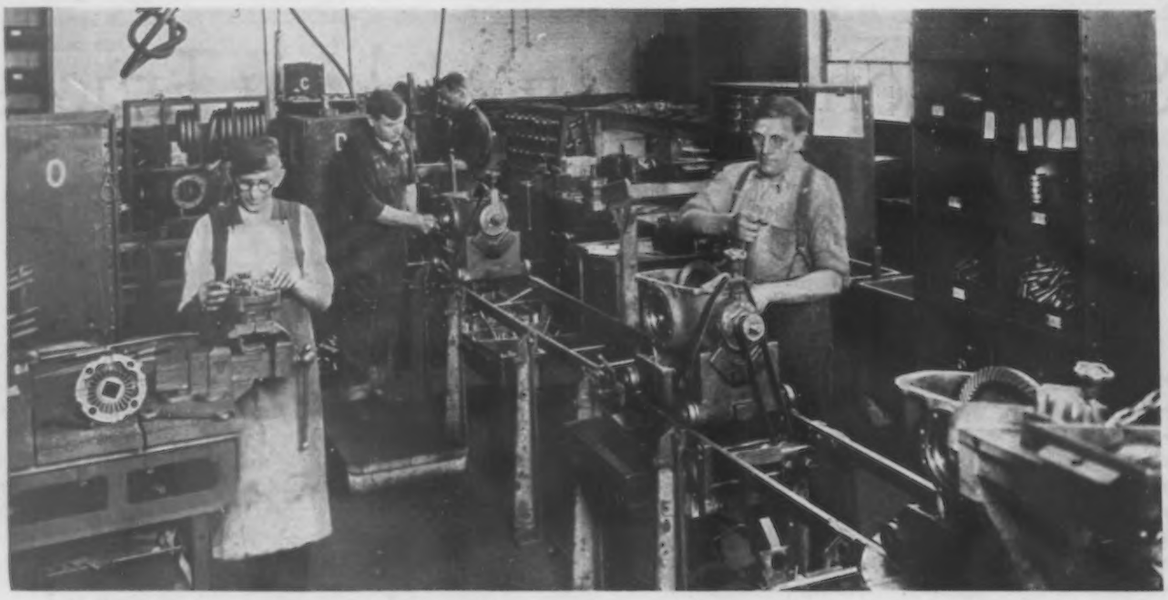


Cylinder Blocks While Being Machined Are Pushed Over Roller Conveyors from One Machine to Another, for Successive Operations, Thus Eliminating Lifting



Differentials for the Lighter Rear Axles Are Assembled on a Wheel-Mounted Carrier on an Assembly Track. Preliminary adjustments are made with the aid of a small motor belted to the pinion shaft

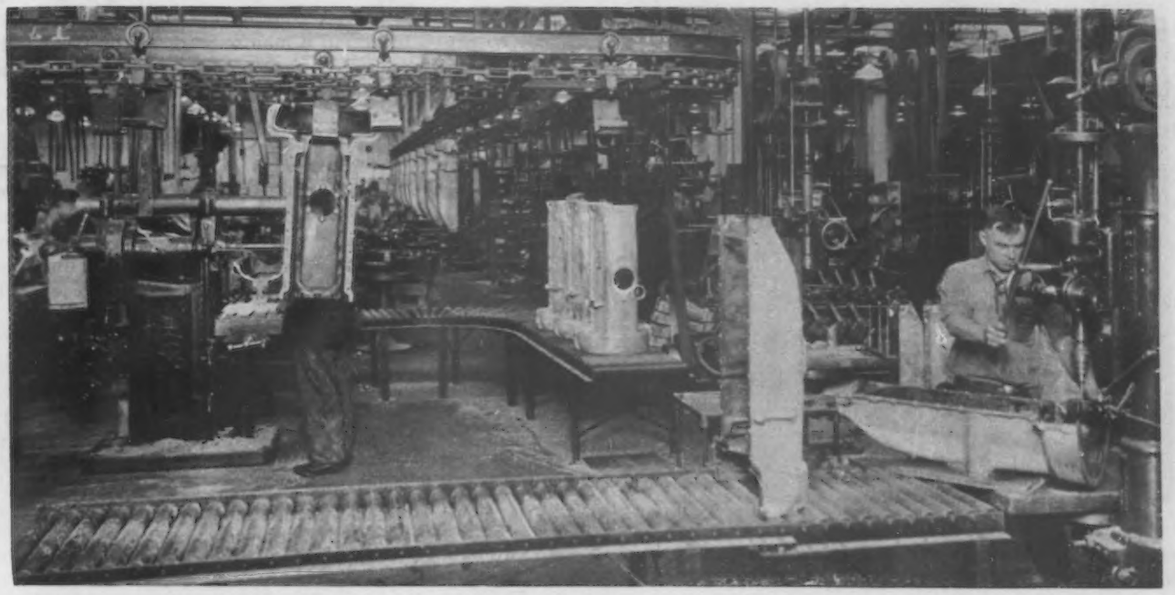
stock flexible and more liquid and reduces the amount of capital that otherwise would be tied up in finished stock.

Special Racks for Special Parts

An interesting feature of the plant is the material handling system, which has been gradually developed and extended during the past year or two. Trucks with special racks arranged for convenient handling of work are used to transport such parts as crankshafts, camshafts and connecting rods from machine to machine during operations, and from department to department and to the finished stockroom. These are mounted on wheels and are pushed by hand from machine to machine for successive operations, but for long hauls they are pulled by a tractor or a lift platform truck. The use of racks on which parts do not come into contact with each other eliminates handling in containers, in which parts are in danger of being damaged, and does away with congestion caused by piling parts on the floor. Some parts are handled on skids with lift platform trucks.

Roller conveyors are used for moving some parts between machine operations and rail type tracks are provided for progressive assembling of transmissions, differentials, rear axles and motors. Hand labor in the handling of material, and consequently the fatigue that it causes, have been materially reduced. One result has been a better

Main Motor Assembly Line, at the Right, Is So Constructed That It Can Be Used for Assembling Motors of Various Sizes and Types

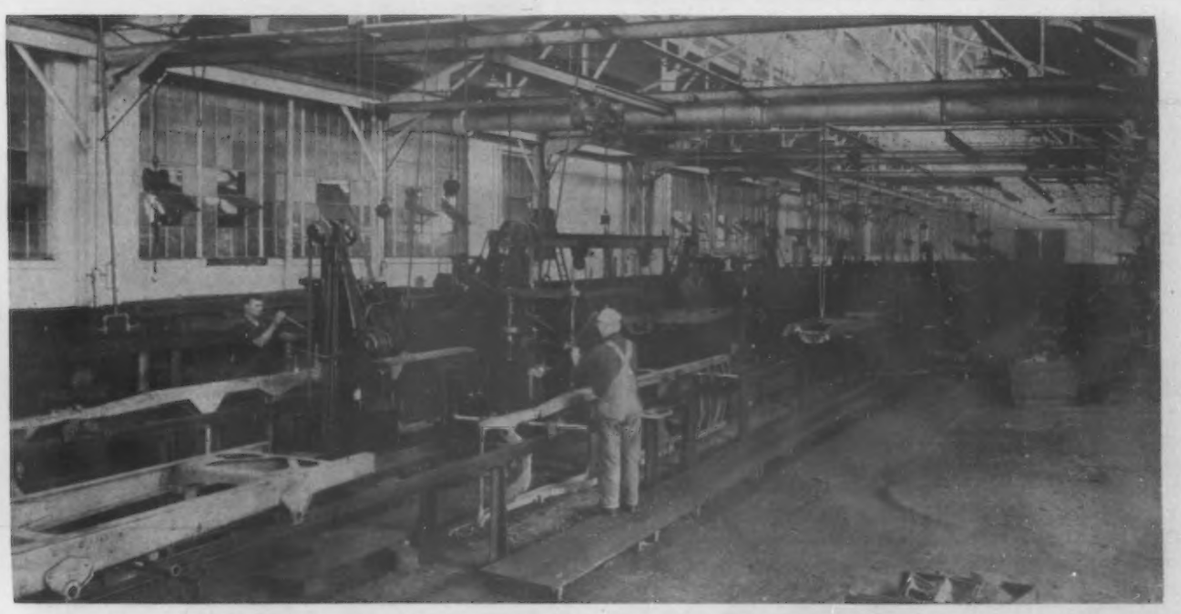


Monorail and Roller Conveyors Are Provided for Moving Crank Cases from Machine to Machine for Successive Operations

quality of work produced. As a man doing production work on a machine is a mechanic rather than a common laborer, the company feels that his efficiency on the machine will be increased to the extent that the amount of handling work he does is reduced. Parts stored on conveyors and racks are stored in a more orderly fashion than would be possible with old methods and there is better stock control.

Crankcases and cylinder blocks are moved from machine to machine on roller conveyors. The two rows of cylinder block machines have roller conveyors connected to the tables of the machines, permitting the blocks to be pushed in a straight line from the conveyor on to the table and, after an operation, on to the next section of the roller conveyor. After the finishing machine operation the crankcases and the cylinder blocks pass over a roller conveyor through a Blakeslee metal washer. From this they move on to a table where an air hose is used in blowing off the chips and water.

Transmission cases are moved through the machining department on roller conveyors. Chain hoists lift the cases from the conveyor to the machine and back to the roller table after each machine operation. On the opposite side of this department gears are cut and other parts that go into the transmission assembly are machined. The various parts come together on the transmission assembly line—a steel track at working distance above the floor. The transmission case, set on a carrier mounted on wheels, is pushed along the track for progressive assembling. A hoist picks



In the Frame Assembly Department There Are Three Parallel Assembly Lines

Chasses Are Assembled on Power Conveyor Lines So Arranged That They Can Be Used for Assembling 12 Different Models of Trucks

up the assembled transmission case at the end of the line and sets it on a test stand.

Crankshaft forgings are brought into the plant on skids handled by trucks and after the first operation on the rough stock the shafts are placed on A-frame trucks holding 10 crankshafts. Camshafts are handled in the same general type of truck. These are loaded on pins on the four sides of the truck, each truck having a capacity for about 60 of the smaller sizes of shafts. The crankshafts and camshafts are pushed on these trucks from machine to machine for successive operations; when finished, the trucks are towed to the assembly line. Flywheels are handled on skids. Pistons are transported on A-frame trucks having shelves on each side. Similar trucks are used for handling connecting rods, each having a capacity for holding 120 rods.

The differential for the lighter type of axles is assembled on a carrier running on an assembly track, the operations being performed at various points along the line. First the case is put on a carrier and when the end of the line is reached it has been built up into a complete rear axle assembly. Permanent fixtures assist in the operations. Some of the parts are banked on adjoining tracks, which are connected to the assembly line by a turntable. When the completed axle is lifted from the line the carrier is pushed off on to a buggy which carries it back to the start of the line.

Assembling Engines on a Conveyor

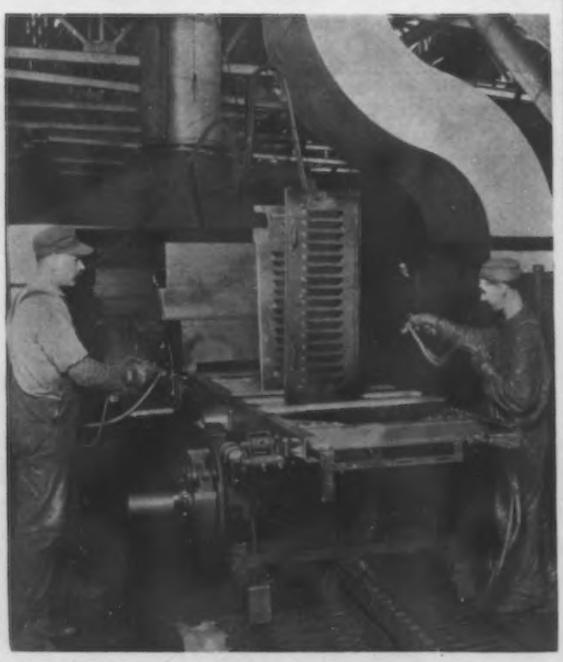
The motor assembly conveyor line is a track built of two flat rails approximately 200 ft. long. This track is sufficiently wide to handle assemblies of all sizes of motors made in the plant. Three roller equipped carriers are bolted to the ends of the crankcase, which is pushed along the track on the rollers. The assembly line is located in the basement adjacent to natural light and ventilation. All finished stock is kept in a stockroom at the side of the line. Several roller conveyors at right angles to the motor assembly line are provided for feeding finished parts from the stockroom to points where they are wanted along the line. Chain hoists operating on overhead monorails at right angles to the assembly line bring the larger units, such as cylinder blocks, crankshafts, transmissions and flywheels, to the line at points where they are to be assembled. Bins are located along the assembly line for carrying small stock, these being supplied from other bins in the stockroom.

Stops are provided in the assembly track to hold the motor at fixed points when parts are being added. The track has short hinged sections at various points, which may be raised to permit a man to work at the front end of the motor assembly. For convenience in assembling there are also roll-over sections in the track, for turning over the unit, which starts on the line with the crankcase in an upside down position. Several half revolutions of the unit are made during the assembly of the cylinder block, connecting rod, pistons and cylinder head. Sub-assembly work is done on benches at the side of the line. Nuts for attaching the cylinder head are driven in by a machine located at the side of the line. Two shorter assembly lines, very similar to the main line, are provided for some of the models.

On completion of the assembly the motor is picked up by hand hoists and put on a running-in stand. There is a network of overhead monorails for handling the motors from this point, as well as for conveying other parts. The finished motors are carried on a four-wheel truck to the dynamometer testing machines and from there to a spray painting booth. After painting and drying they are placed on trucks, five to a truck, and hauled to the chassis assembly floor.

Frames Put Together in Three Lines

Three parallel lines of the rail type are provided for the progressive assembly of frames. Two of these are for the lighter frames, which are received assembled with the exception of the brackets, and the third for the heavier units. The frames, as they move along the lines, rest on bar supports extending beyond the rails on each side, and mounted on a carrier which runs along the rails on two wheels. Layout jigs for centering the holes are suspended from overhead hoists that move on a monorail above the assembly lines. Electric hoists mounted on hand propelled trolleys are used for turning the frames over. Suspended from the hoist is an I-beam, at each end of which is a wheel-operated chain that is swung around the frame for turning it over. The side members of the heavy frames are placed on the line, cut to length and bent. The frames are hot riveted,



Section of Final Assembly Line Where the Chassis Is Spray Painted, After Which It Moves into a Drying Oven

rivets being heated electrically. An electric hoist, on a monorail extending over the lower end of the frame assembly lines, picks up the completed frames and carries them to the adjoining erection or assembly shop.

Three parallel chassis assembly lines permit progressive operations. The frame is first placed on two horses mounted on casters. Then the front axle is placed beneath the frame on a dolly and the front springs are fastened to the frame. Then the rear axle is run under the frame on a second dolly and the rear springs are fastened to the frame. The frame at this stage is resting on the two dollies, each mounted on two wheels at each end. The dollies serve as a carriage while the chassis is being moved along the line.

The frame is pushed forward until the first dolly is engaged by the power conveyor of the chain type, which is just above the floor level. As it moves along the line the dolly wheels run on plate rail tracks laid on the floor. Then the motor is let down into the frame by an overhead chain hoist, and the other parts are fed into the chassis from either side as the latter moves along the line.

At the end of this assembly line all parts have been put on the chassis except those which would be injured by heat. Reaching the end of the line the chassis is transferred by means of a monorail hoist to the second conveyor line, on which it moves in the opposite direction, to be cleaned and painted. The conveyor carries the chassis through a washing booth, where it is washed with steam and the dirt is blown off with air. Then it is spray painted in the second booth, in which there is down-draft suction through openings in the floor, to draw away the fumes. It moves from the painting booth into a steam heated oven where the paint is dried. Leaving the oven, a hoist sets it on the third conveyor line and, while it moves along this under power, the wheels, tires and cushions are put on, finishing the chassis assembly.

The assembly conveyor is 350 ft. long and moves at a speed of 3 ft. a minute. The larger units to be used in a day's operation of the chassis assembly line are usually put on the assembly floor at night or early in the morning. Small stock is kept in bins and racks along the line, and one day's supply of the larger parts, such as wheels and axles, is on hand at the proper points on the floor when the assembly starts in the morning. The times of all operations in chassis assembling have been determined by time studies, and the men working on the line are paid under a group piece rate and bonus system fixed for the crew as a whole.

A method of laying out machinery that is followed in the planning department has proved highly satisfactory. All equipment in each line of buildings is shown in a factory layout made on 9 x 20-ft. layout boards on a scale of ¼ in. to the foot. When any change in the arrangement is desired, because of the addition of new models or the installation of new equipment for old models, a layout is made on the board. Small pieces of cardboard are used, in different colors, pinned to the board to indicate each machine and its type; lines show the location of conveyors and trolleys and strings show the proposed routing. The proposed routing as prepared by the planning department is closely studied by the production department heads, and perhaps a number of changes may be made before a layout is decided upon. When the arrangement is definitely agreed upon, the pieces of cardboard showing the location of the machines are replaced with similar pieces which are all blue, and the board is kept as a permanent map of the department layout.

Stresses Induced by Arc Welds

IN an effort to investigate the stresses induced in a metal plate by the electric welding process, the committee on welded rail joints of the American Electric Railway Association took a ½ in. plate, 8 in. wide and 24 in. long, and deposited a small welded bead on one 24 in. edge. L. H. Crook of the department of mechanics, Catholic University of America, Washington, studied the stresses by a comprehensive set of strain gage readings.

Large "negative" or compressive stresses are induced in the plate adjacent to the weld. Some of these are beyond the elastic limit of the metal, so numerical values cannot be given them. These deformations persist even after the welded bead is carefully milled off. Along a line two inches below the head an elastic stress of 30,000 lb. per sq. in. is reduced 50 per cent by cutting away one inch of the plate. The stresses in all parts of the plate seem to be reduced by approximately one half of their original value when the first inch below the bead is cut away. Maximum tension stresses of about 15,000 lb. per sq. in. are induced in the edge farthest away from the weld; the neutral axis is about one-third the distance from the bottom edge.

Carnegie Safety Trophy a Miniature Converter

THE safety trophy for which the various plants of the Carnegie Steel Co. will compete in 1929 is an actual Bessemer converter in miniature, perfect in detail, and fashioned after a unit at one of the principal plants of the company.

The converter, supports and accessories are of sterling silver and rest on a bronze plinth, oblong in form, 25 in. by 34 in., which bears silver shields designed to carry the names of the monthly winners. At the front and rear of the converter are bronze statuettes of two of the master steel workers, one of whom is employed at the Homestead plant and the other at the New Castle, Pa., works. Beneath the figure on the front of the composition appears the name of the company, cast in bronze, and a larger shield or plate which will carry the name of the winner in perpetuum at the end of the year.

Mechanizing Minnesota Iron Mines

Changes of Late Years in Both Underground and Open-Pit Mines—Electric Power Shovels

MECHANICAL ENGINEERING in the iron ore industry was covered in a comprehensive paper by A. Tancig, mechanical superintendent Shenango Furnace Co., Chisholm, Minn., presented before the recent St. Paul-Minneapolis meeting of the American Society of Mechanical Engineers. The following has been taken from the contribution:

High production at low cost is the aim of both the open-pit mines and the underground mines. It should apply more particularly to the latter, because production in underground mines is naturally limited. To obtain low costs we are mechanizing more and more our underground operations—using hand-held air-operated jack-hammer drills for hard ground, and hand-held air-operated auger drills for softer ground. Hand shoveling or mucking the ore into cars is a thing of the past in most mines. Loading into the cars and chutes is now being done by slushers, or scraper loaders, a machine consisting of an electric-motor-driven two-drum hoist, with one pulling rope for hauling the loaded scraper and a tail rope for returning the scraper to the face.

An indication of the usefulness and growing demand for these scraper loaders is that the earliest type, six years ago, had a 2¼-hp. motor, whereas today we have them as large as 20 to 50 hp., with either clutch or remote control. The net result is less arduous labor, greater production per miner, and a reduction in the cost per ton of ore produced.

Cars in use underground range from the 1-ton-capacity sub-level type to the 5-ton main-level type, all with ball or roller bearings. The main-level cars have half to three-quarter size automatic couplers to facilitate handling in trains, and are run at high rates of speed over heavy steel rails. The cars used underground are all-steel, sturdily built, usually for 24-, 30- or 36-in.-gage track, with 14- to 16-in. diameter wheels. Chilled-iron wheels are considered preferable to manganese, as being less abrasive on the rails, frogs and switches. As yet, steel ties have been used little in the underground mines, although the only objection is the initial cost.

Steam-engine, handbrake-operated hoists are being replaced with electric-motor-driven hoists, either directly connected or having a single-gear reduction with herringbone gears and oil-operated post brakes. The latest hoists are equipped for safety with overspeed and overwind devices. Such electric hoists range from 100 to 1300 hp. (motor rating) and are for depths of from 200 to 2000 ft.

Pumping Equipment of Today

Underground drainage has been shifted from the old reliable, though sometimes bulky, steam pumps, requiring large pump stations underground and long steam lines, to motor-driven centrifugal pumps or motor-driven multi-plunger pumps. A recent addition to our pumping equipment and one that gives great promise of further economies is the deep-well turbine-type pump.

The last few years have seen continued abandonment of the isolated power plants which every mine had and the installation of electrically driven equipment. The result is a more flexible and efficient operation, fewer men employed and a lower production cost.

When the underground mines operate during the winter, they accumulate stock piles of ore that are loaded during the shipping season into 50- or 75-ton steel ore cars by steam shovels. Where the shovels are electrically operated and have caterpillar traction, only two men are required to operate each one, where formerly eight men were necessary.

Open-pit mines have relegated the smaller underground producers to the point where their high cost and low production are at best a worry and sometimes a liability. Mines of the open-pit type had their real start in the early 'nineties. The equipment included the ordinary contractor's scrapers, carts and shovels, all of a type which can be seen today in any small grading or foundation job. But the growth of the industry created a demand for bigger and more efficient equipment, until today the machinery is the latest, most efficient and largest in existence for mining purposes.

Electric Power Shovel Introduced

Up to six years ago all shovels were of the steam type, ranging from the 1½-cu. yd. dipper capacity, 50-ton type, to the 8-cu. yd. dipper capacity, 350-ton type. The average production shovel, however, was the standard railroad type having a 4-cu. yd. dipper, self-propelling on rail sections, 135-lb. steam pressure, approximately 85,000 lb. bail pull. These shovels have lately been fitted with caterpillar traction to facilitate moving about and to reduce the labor servicing each machine.

About seven years ago electric power shovels were introduced on the iron ranges. While their general adoption was slow, it was not because of any lack of appreciation of their advantages, these being only too obvious. But rather it was because of a policy of watchful waiting until most of the objectionable features could be corrected by their manufacturers. This policy of cooperation between the few users and the manufacturers was a wise one, because today we have not a large variety of makes of electric power shovels, but rather the shovels of only two manufacturers are in general use.

OPERATING COMPARISON, APPROXIMATE, FOR EACH SHIFT

	Steam		Electric	
Operator	1	$10.35	1	$10.35
Cranesman	1	7.55	0	....
Fireman	1	5.70	0	....
Oiler-helper	0	....	1	5.70
Pit men	5	21.70	0	....
Night watchman	1	5.70	0	....
Power for 1500-cu. yd. per shift		32.25		12.00
Interest on investment		7.00		11.60
Maintenance, season repairs and Sunday watchman		9.00		3.00
		$99.25		$42.65

The figures are given merely to show the trend and the result of modern planning. These later-type shovels have cut herringbone gears, inclosed ring-oiled bearings, pressure lubrication, bronze-lined bearings, castings of steel, alloy-steel shafts. Motors and motor-generator sets have ball or roller bearings and the shovels are as nearly automatic and fool-proof as it seems humanly possible to make them.

Ore-Hauling Cars

Two classes of cars are used in the pits. One is the standard 50-ton and 70-ton all-steel ore cars belonging to the railroads and hauled in trains to the ore docks after being loaded in the pits. The other class is the mine-owned

all-steel dump cars ranging from 16 to 30-cu. yd. capacity, equipped with air brakes and with large air cylinders on each side of the center frame for dumping the loads.

In connection with certain pits having ores which require beneficiation, there are ore-washing plants for removing the free silica from the ore through agitation in water. The washing plants, developed over a period of years, range in capacity from 125 tons to several thousand tons an hour.

A later beneficiation plant is the crushing and screening plant for screening out the large lumps of ore and crushing them to shipping sizes. Whole trainloads of ore from the pits are dumped into the bins at one time, and the material is screened, crushed and reloaded into ore cars within the space of a few minutes.

An interesting sidelight on the increasing use of machinery in production of iron ore is in the fact that there has been no increase in the accident hazard. This result is being achieved because the safety of the employee is always the first consideration when laying out or purchasing new equipment. The employee's safety has become so important that each mining company has a separate department whose sole duty is to cooperate with employees, foremen and superintendents in promoting the greater safety of everyone on the payroll.

Index Which Prophesies Trade Movements

Methods Used to Construct the Valve and Fittings Index Used by Walworth Company to Control Manufacturing Activities

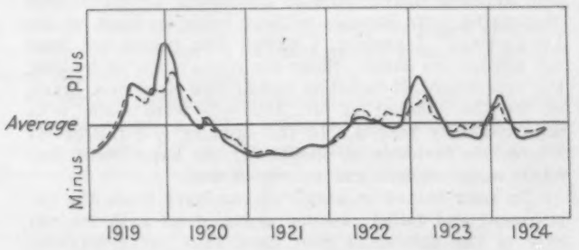
AT the recent Chicago meeting of the American Management Association, Joseph H. Barber, assistant to president, Walworth Co., discussed the scientific methods underlying the "valve and fitting index." His company had been attempting unsuccesfully to correlate production records with known conditions in various markets, and in 1921 concluded that the fluctuations in its business could be best explained in the light of normal activities in general trade.

Next it was agreed that the general trade conditions were most promptly reflected in the flow of orders from jobbers. Evidence that this holds true was found in a study of merchant pig iron, for which statistics are available for many years showing orders, shipments, production and prices. The Walworth company's problem then was to find some index, related to orders or to demand (in the several basic industries which consume valves and fittings) which could guide it in budgeting for production. Of course, it was recognized that if some such index could be devised which would closely parallel the condition of the Walworth company's order books, even that would be of little use in forecasting business conditions, unless an adequate theory on the business cycle could be invented.

In attempting to build up an index curve, the many items of valve and fittings manufacture were segregated into several classifications of related products, and the production curves of each group studied individually. It was found immediately that these curves showed violent fluctuations, even though Carl Snyder's "volume of trade index" (carefully adjusted to eliminate seasonal and secular variations) varied no more than 10 per cent up and down. But when plotted data on the various industries which bought a certain group of fittings (called for convenience Group A) was compared, it was found that the swings were from 4 to 12 times as violent as Snyder's volume of trade index for *all* American industries.

In order to compare this mass of more closely related data, the curve for each industry was recomputed in terms of its own "cycle unit" by methods used by the Harvard Committee of Economic Research. When these adjusted curves for the consuming industries were plotted on a single sheet, and an average struck, it was found to show a surprisingly close relationship to the curve showing orders for Group A of Walworth goods. An even better agreement between the curves (see chart) was forced by giving the various industries appropriate weights, as suggested by knowledge of sales conditions, or by the evident divergence of individual data in those parts of the curve where the unweighted average departed considerably from the curve representing actual sales of Group A products.

This study proved that orders in Group A fluctuated widely because, on the average, the industries which give orders for such products fluctuated in the same way. Therefore, to budget production of these products intelligently, it would only be necessary to collect opinions and forecasts for each of these consuming industries, reduce them to numerical statement, give each one its proper



Close Agreement Between Orders for Product (Full Line) and Complete Trade Condition in Consuming Industries (Dotted Line)

weight, and plot the result. If the curve turned up, prepare for increased orders; and vice versa.

When this plan of study was worked out for the various classes of valves and fittings, several pronounced similarities in the various groups were discovered. Furthermore, some of the consuming industries were much more "sensitive" than others, that is, seemed to have most effect in the marked divergence from those indexes related to more general business conditions. It was therefore to select the most important or indicative from the 60 series of data available and compute the final index as a weighted average of 16 separate indicators of national demand. Five of them are the "sensitive" ones, and the rest are responsible for the relatively stable absorption in such lines as buildings and equipment. Experience has shown the valve and fittings index, as so computed, to have the following distinctive features:

1. It is a broad sample of conditions, not a single company's experience.

2. It measures the volume of jobber orders; therefore measures jobber's psychology.

3. It indexes trend of demand—the orders to be derived from basic industries.

4. It measures quantity of going business, rather than prices or profits.

5. It turns corners ahead of other barometers, because it reflects immediately conditions among the jobbers.

6. It has definite swings, because of the "sensitive" factors included in its composition.

Should Furnaces Run on Sunday?

Question of Shutting Down Blast Furnaces Once a Week a Live Topic 79 Years Ago

WHETHER men employed in steel and iron plants should work on Sundays had the attention of those engaged in the business as long ago as the middle of the last century. Going through some correspondence of his grandfather, Frank Brooks, vice-president First National Bank, Pittsburgh, discovered letters bearing dates of July 18 and July 19, 1849, that dwell upon the feasibility of shutting down blast furnaces on the Sabbath Day. A transcript of a reply made by J. Kennedy Duncan, who operated a blast furnace at Springhill Furnace, Pa., to the Rev. Isaac M. Cook, a clergyman of Beaver, Pa., together with the observations of his brother Samuel Duncan, are interesting as showing the views of blast furnace men of those times on the matter of interrupted operation of the furnaces.

Springhill Furnace, Pa., July 18, 1849.

Dear Sir:

Yours of 10th inst. on the subject of closing blast furnaces on the Sabbath Day is before me. To your first inquiry, "Have you ever attempted the experiment of running your furnace without being in blast on the Lord's day?" I answer, I have. The result has been not always the same. Some six years since, in making the experiment, it failed on one or two occasions. Since, up till the summer of '47, attempts were made with unsatisfactory results. In the summer and fall of '47 I had two furnaces in operation; the experiment was again made at both and succeeded well.

To your second inquiry, "If you have made the experiment and failed can you acquaint us with the nature of the difficulties that have thus far frustrated your endeavor to hallow the Sabbath; are they accidental, such as might be remedied by improved machinery, or by removing the necessity of running on the Sabbath because of competition, or are they permanent, growing out of the nature of the business"?

I reply that the failure in the first experiment was owing to the nature and quality of the ores then used, together with a decided dissatisfaction of the workmen who, strange as it may appear, though no diminution was made in their wages, were decidedly opposed to closing the furnace on the Sabbath. Any lack of yield, or if the yield was there and the iron not so good, was always attributed to stopping one day in the week. This to me was a serious difficulty from the fact that it always excited my suspicions that they did not do their duty, although I had no positive evidence of it other than this—that, instead of being stopped 24 hours, it was usually 30 and some times more. I would say then, from the experience I have had, that the blowing of furnaces does not grow out of the nature of the business unless it be owing to certain qualities of ore that are of a hard and obstinate nature, more or less impregnated with sulphur. This difficulty I suppose would be remedied by using hot blast—I have always used cold blast.

To your third inquiry, "If you have succeeded in the experiment is your iron of as good quality as before; by resting do you lose more than one day's blasting? Is your machinery different from that in common use? Do you make more or less high metal than before? What effect has the change had on the conduct and character of the hands", I state the quality of iron is the same—high and gray iron about in the same proportion as when blasting all the time. As a general thing there was no loss of stock that I could perceive. The machinery for blasting as also the construction of the furnace are as those in common use.

I could not discern any material change in the conduct and character of the workmen other than this, that instead of seeing them at their accustomed posts on the Sabbath they would as a general thing, (at least seemed to be) in their "right mind," for they were clothed and found their places in the sanctuary of God. Allow me the privilege here of saying that in seeing these toiling men coming into the church door and orderly taking their seats, listening with attention to the Words of Life as they fell from the lips of him who was ministering in the Saviour's name, was truly a source of real enjoyment.

It is further my duty to state that, although the furnaces before alluded to operated successfully for a time by resting on the Sabbath day, yet subsequently to my great mortification I have been under the necessity of blowing, during what time the furnaces have been operating, on the Sabbath day. This was owing as I supposed just to a very decided defect in the boshes, which occasioned the putting in of no less than six new hearths in the space of one year, whereas one ought to have been sufficient; second, to the working of poor ore that was of a hard, inflexible character, requiring more coal than ordinarily for smelting.

I also inclose you a communication from my brother Samuel on the same subject.

Very respectfully,

J. KENNEDY DUNCAN.

Rev. Isaac M. Cook, Beaver, Pa.

Fairchance Iron Works, July 19, 1849.

Dear Kennedy:

Agreeably to your request I now give you my experience in blowing furnaces, or rather in not blowing, on Sundays. I think much depends on the stack—that it is tight so as to exclude the air, and a great deal more on the quality of the ore. I mean ore that is easily smelted. In operating with Wharton Furnace in 'forty seven, we adopted the plan of stopping every Saturday night at 12 o'clock and opened 12 o'clock Monday morning; the furnace did well. We made from 16 to 19 tons of metal per week, that is in the six days, which was generally considered a good week's work when Sundays were included. The stack, however, is good, and the principal part of our ore the very best.

We found no difficulty either in stopping or opening up the furnace, as regards the working of it. We would have running cinder in an hour after the blast would go on Monday morning, and by daylight to all appearances the furnace would be hot and working

(*Concluded on page* 1451)

New Fabricating Plant in Philadelphia

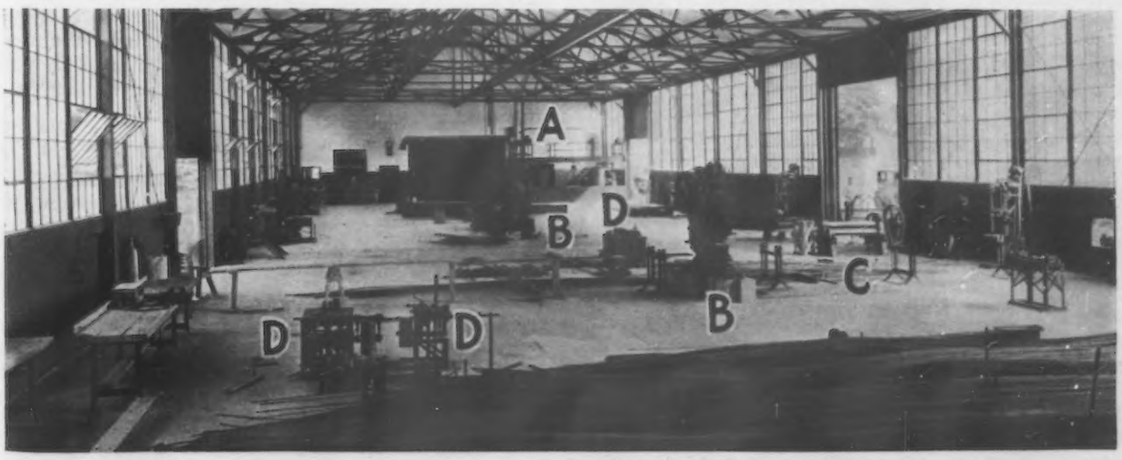
American Steel Engineering Co. Has Space for Considerable Expansion—Easy Handling of Materials

SEVERAL features of the new plant of the American Steel Engineering Co., 3520 Queen Lane, Philadelphia, impress themselves upon the visitor. The plant has been laid out with forethought as to expansion, and in such way as to facilitate handling steel in and out. It is served by a spur track, from the Reading Railroad, which enters the main building at about mid-length and goes clear across.

On the railroad side of the building, traversed, of course, by the same spur, is the steel yard, under cover but not sided in. This shed is of the same span, roof height and skeleton construction as the main building and immediately adjoins it. Expansion will take the form of continuing this shed building to a length approximating that of its mate and closing the ends and sides, making a second broad bay, parallel to the first, for fabricating work.

Across the street end of the present building is a two-story office and storage building, of brick facing on concrete and measuring 32 x 64 ft. The fabricating bay, in one room, is 64 x 220 ft., directly in rear of the office. Its roof trusses leave 20 ft. clear above the concrete floor. The walls are concrete to about 6½ ft., then ribbed glass to the eaves along the two long sides.

Fabricating work is done mostly upon the basis of engineering in the plant. This covers all details both for structural steel and for reinforcing steel, both of which are prosecuted over a considerable territory centering in Phila-



Interior of the Fabricating Shop Looking North. At A is the platform for tool room or machine shop, with compressor room under it; B B are the punches and shears; C is the roller straightener for plates; D D D are bar benders

At top of page is the plant, viewed from the Reading Railroad crossing. The steel receiving shed appears prominently in center, with storehouse this side of it. At its left is the forge shop

delphia. Bridge work is not attempted, except on simple designs similar in detail to structural forms for buildings.

Materials handling is by means of traveling hoists running on I-beams supported directly under the roof trusses. One 5-ton hoist is electrically driven and carries a cab. The others are differential chain hoists operated from the floor. It is planned to put in a light overhead traveling crane in the main bay, as the present runs do not give the flexibility expected.

Two Pels combination punches, shears and plate slitters are the heaviest pieces of fabricating equipment. The larger one can take a 15-in. I-beam and can punch a 1-in. hole through ⅞ in. of steel. Some changes are being made so that it can handle 24-in. beams. The other one is used mainly in cutting bars. Three Kardong benders (Minneapolis) are used for reinforcing bars. Two of them are motor-driven. There is a set of bending rolls for plates. For bending structural shapes, when required, reliance is placed on a small forge shop, in a separate brick and concrete building.

There is the usual machine-tool equipment of a fabricating shop—drills, shaper, power hacksaw, etc. A small machine shop is being installed, on a balcony above the air compressor room, which will be in the nature of a tool room, but will be available for a variety of work. This is under command of the projected traveling crane.

Much welding is being done, so far as building regulations and codes permit. That done in the shop is electric, with General Electric units. Field welding is by gas. In a few cases, where it has been necessary to remove a clip or other piece which had been welded on, the clip broke outside the weld and the beading had to be chipped off.

One useful "kink" observed in connection with the bar cutter was in the method for gaging lengths. The bar being cut lies in a trough consisting of a long channel, web downward. At 3-in. intervals holes have been punched through both flanges. These accommodate a gage block. For variations from exact 3-in. lengths, 1-in. or 2-in. spacers are used. Foot marks are stenciled on the channel at the appropriate holes.

Natural light is very good, all over the shop. Night work, which is not infrequent at present, is facilitated by the electric lighting system, lights being suspended in sufficient numbers just above the bottom line of the girders. Heating of the office is by hot water, with gas fuel, under thermostatic control.

In addition to its work of fabricating (and often erecting) steel, the company maintains a welding equipment department. It acts as distributer of General Electric welding units, having territory extending from southern New Jersey over all of Pennsylvania, Maryland, Delaware and most of West Virginia. To handle this business in the western part of Pennsylvania, a branch office has been established in Pittsburgh.

How Procedure Control Welding Originated

Rapid Construction of Overland Pipe Lines Magnified All Managerial Problems Found in Production Welding

BY G. O. CARTER*

WELDING metal by the use of the oxy-acetylene flame (or "oxwelding") had its first beginning in the United States in the early years of the twentieth century, following experimental work done in Europe. The development in 1906 and 1907 of a commercial source of oxygen gas gave the process its first real impetus and oxwelding began to be used to an appreciable extent in American metal working industries.

At first the process was most often used for emergency repair and proved a great boon in many instances. Tremendous amounts of money were saved through reconditioning equipment that otherwise would have been scrapped and in preventing losses through production delays.

Even in these early days, however, it became evident that there was an important application for oxy-acetylene welding in routine production. Of the early ones was the manufacture of steel barrels, and a little later the welding of pipe for various services began to assume some importance.

Early Work on Pipe Joints

As far back as 1911 some work on overland lines of steel pipe was done, and there is a line transporting manufactured gas now in operation which was laid by welding during that year. At the Panama-Pacific Exposition in 1914 practically all of the pipe for all services from water to high-pressure steam was oxy-acetylene welded, this installation involving many miles of pipe in many different sizes.

In the summer and fall of 1922 an important forward step in the construction of pipe lines was taken. A 140-mile, 8-in. oil line was laid by the Prairie Pipe Line Co., under the supervision of N. E. Wagner. The work was eminently successful and was described by Mr. Wagner before the International Acetylene Association. Mr. Wagner's work won for him that association's highest award, the Morehead Gold Medal for 1922.

It thus became quite evident that the laying of overland lines with oxwelded joints offered an important application of the oxy-acetylene welding process. However, there were a number of considerations, involving management and operation, that seemed likely to affect the acceptance of welding as a routine construction method for pipe joints.

Difficulties Encountered in Scattered Crews

Early opponents of the welding idea stressed the fact that the quality of the welded joint was dependent on the skill and integrity of the welder. Others pointed out that it required supervision of men more than ordinarily skilled in welding practices to insure uniformly high-grade results. Laying a pipe line in the oil or natural gas country, where the welders operate many miles from their base of supplies and under varying conditions of weather, offered a difficult problem in personnel, training and management. Transporting oxygen and acetylene to the welders also involved some difficulties and the matter of an adequate method for field testing the finished joints before the line was put into operation was another item that required study.

It was evident from the beginning, to members of our organization, that if pipe welding was to be generally accepted these various matters would have to be studied and the best practice developed for each of the fundamental ele-

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*Consulting engineer, Linde Air Products Co., New York.

BOOK REVIEWS

Employee Questions Statistically Treated

Employee Representation. By Ernest Richmond Burton. Pages 283. 5⅝ x 8 in. Published by the Williams & Wilkins Co., Baltimore. Price, $3.

In an excellent preface to Mr. Burton's book, Henry C. Metcalf calls attention to the three significant contributions that employment representation is making to American industry: converting industry from a purely productive process into an educational experience, facilitating the realization of more truly scientific management, and injecting new meaning and value into democracy.

What this volume covers is an investigation of the history of employee representation in this country, the motives prompting employers to install representation plans, and the obstacles and difficulties that have beset the movement; and finally, an interpretation of employee representation and the desirable direction of its further development. Indications thus are that the author had made up his mind before making the investigation.

The author's definition of the term "employee representation" is: "broadly . . . to include any established arrangement whereby the working force of a business concern is represented by persons recognized by both the management and the employees as spokesmen for the latter in conferences on matters of mutual interest."

Neither the various socialistic and academic experiments in Europe, nor Mill's approval of workers' election of managers, is causally related to the present development. The oldest case in operation in this country is the Filene cooperative association, started in 1898 as an insurance committee. Other companies strove in this direction, but not until 1915, or say when Rockefeller became an earnest advocate of the system, was there any very great progress in this direction. To speak of the various attempts, successful and unsuccessful, in this country and abroad, would take up too much space; so we come to the essential features of the American development of the movement in question.

Special chapters are devoted to the sources and nature of modern industrial conflicts, the managerial objectives of employee representation, the methods of organization and extension of the plan, managerial responsibility for operation, the methods of assuring adequate representation of the employees, joint conference bodies, organization for integration, some of the problems of operation and their solution, and terms and conditions of employment.

There is a good appendix of selected bibliography. As a whole, the book leaves the impression of being a mass of statistics rather academically treated.

Covers Patent Matters for the Engineer

Patent Office Practice. By Archie R. McCrady. Pages 387, 6½ x 9¼ in., illustrated. Published by H. D. Williams Co., Ouray Building, Washington. Price, $10.

Each year America produces more inventions than the previous year; each year the work of the United States Patent Office increases in volume and technicalities; and each year patents for invention become more and more a factor in the country's industrial development. It is by no means an easy task for the inventor to keep abreast of the technical procedure involved in the procuring of his patent.

To meet this situation quite a number of books have been written by patent lawyers covering various phases of technical patent law and Patent Office practice. It has, however, been left to A. R. McCrady to bring together in one volume a concise consideration of the rules of practice, quoting the rules themselves and following with a discussion of the law, supported by a citation for each statement. The table of cases includes more than 1600 decisions and the table of contents, 413 headings. The topical arrangement follows closely that of the Patent Office rules of practice with which attorneys and inventors are familiar. The typography is pleasing and the language simple and easily understood and the general arrangement effective for ready use. The index appears to be complete.

The author presupposes a knowledge on the part of the reader of the fundamentals of patent law. The book is addressed to the busy patent attorney and to the engineer who, having had a liberal amount of experience with patents, is desirous of having at hand a volume which will give to him the answer to the hundreds of questions which must come up in his mind. It is a work which will be found of great value to the intense student in the patent field.

The basis of the volume is the collection of notes of Loyd H. Sutton, a successful practitioner in the patent field, a former examiner in the Patent Office, and lecturer at George Washington University on the subject of patent law. Mr. McCrady has bestowed four months of intensive work on these notes, putting them in shape for publication. He has revised them, added to them, rearranged them, and checked them over.

Cartels in Germany and Elsewhere

Kartelle und Staat, unter Beruecksichtigung der Gesetzgebung des Inund Auslandes. By Dr. O. Lehnich. Pages, 314, 6 x 9¼ in. Published by Reimar Hobbing, Berlin. Price, 16 m.

Of course, "cartel" has a very elastic definition. Before the Great War when it was attempted in Germany to frame a law covering rings, cartels, gentlemen's agreements, syndicates, *et id genus omne*, there were in the empire at least four hundred such, of about twenty different varieties—vertical, horizontal and otherwise—and it remained for the late Hugo Stinnes to increase the number and variety.

As the functions of each cartel must be considered in relation to one or more of all of four principal factors—selling conditions, price-fixing, amount of production, and method and amount of sales activities—it will be seen that writing a work on this subject is somewhat like preparing a detailed description of the universe, with particular reference to the seven or eight bodies most familiar to us terrestrials.

Demand and supply of course play a great *rôle*, and cause the rise and fall of one or the other of the various kinds of combinations intended to produce proper equilibrium. For, as the author remarks, when demand is greater than supply, the State must protect the consumer from the producer; the converse, when supply is too great. There are also to be considered such items as movement of population, climatic conditions, natural resources, political divisions, water supply, etc. To all of this we add the general trend of public opinion, and the differences in development and surge of the various branches of industry.

The author starts with the statement that cartels are "agreements between independent producers in the same line, for the purpose of regulating the market and limiting production." He is not of the opinion that their purpose is monopolizing the market, but that they are simply to regulate and reduce competition. The fact that they can first fulfill their purpose when the circle of firms is closed, and that especially for this reason cartels that regulate produc-

tion especially desire monopoly does not, in his opinion, alter their object.

The third section of the book considers what is of comparatively little importance to Americans—the purely German cartel laws.

The fifth section concerns cartels in countries without any special laws governing such matters: Peru, New Zealand, Australia, Argentina, etc. The sixth groups according to, on the one hand, whether they provide for legal measures against combines, or, on the other hand, provide full legal protection for them.

England is the only country in which free competition is defended by law. There is no especial legislation about cartel contracts; all is governed by the "common law." France is a good example of making the law agree with the business conditions that it is intended to control; both bearing and bulling of prices being forbidden. In Switzerland the French laws of the late thirties were introduced in some cantons, private agreements preventing unlimited competition. In Belgium, fine and imprisonment threaten those who by illegal or improper methods either raise or lower prices artificially and in great degree. Italian anti-cartel laws are much like the Belgian. In Spain there is no great tendency toward combinations, but there are laws against those tending to limit competition and raise prices unduly. Holland does not concern itself, as a State, with cartel matters. Denmark has a recent law against combinations tending to limit competition. In Hungary, although cartel matters were debated for a great while, there is as yet no law governing them. In Japan there is a law against "uncommon regulation of prices in order to attain excessive profit."

The excellent alphabetical index, and the list of works collated (nearly three hundred in all) show the thoroughness with which this volume has been prepared.

ROBERT GRIMSHAW.

Cyclopaedic Account of Automobile Steels

Autostaehle des Welthandels. By Dr. A. Mueller-Hauff and Dr. K. Stein. Pages, 189, 5¼ x 8½ in.; illustrations, 39, and plates, 10. Published by Verlag Stahleisen, Duesseldorf. Price, m. 9.

The fact that 90 per cent of the materials employed in the automobile industry consist of iron and steel, and that without the comparatively recent improvements in the latter material the wonderful progress in that industry would have been impossible, shows us that "auto-steels" deserve a thorough technical and practical work all to themselves. Here they have it.

Up to date there has been too little exchange of data and opinions on this topic among manufacturers, metallurgists, and technicians generally. This book is a good start in this direction. The progress from melting in crucibles to manufacture in the Siemens-Martin furnace has been of inestimable value to the automobile industry; but there has been no thorough compilation of data concerning all the different varieties of special steels as applied to special purposes.

This little book takes up very practically and thoroughly the matter of testing for elasticity, tensile strength, hardness, etc., by all the approved practical methods known to the technicians. It then proceeds to metallography, with special reference to the influence of manganese, nickel, chrome, and tungsten. Next it treats of the manufacture, as such, of auto steels, going into the details of melting, casting, forging, and rolling, with particular reference to the character of the surfaces attained. Tempering, welding, cold drawing (with its advantages and disadvantages) and general machining, etc., receive careful and competent attention.

The chapter entitled "Auto Steels" covers the ordinary carbon varieties, re-adoption of the so-called silicon steel (0.10 C., 0.50 to 0.80 Mn., 0.70 to 1.00 Si.) is taken up. As this steel has a very high elastic limit (60 to 70 per cent as against the usual 50 to 60) it is well worth attention.

Case-hardening of ordinary and ternary steels, with particular attention to the discovery and the elimination of defects, especially warping, receives due consideration. Krupp succeeded in doing away with this evil by giving a very high surface hardness—in fact, such steels would scratch glass. The use of chromium is recommended in this connection. The author gives space to mention a process long known in the laboratory, but not sufficiently adopted in practice, namely, the employment of at least 6 per cent of nickel and about 0.5 to 1 per cent of chromium to prevent warping. Steels with this composition, cooled slowly in the air from about 800 deg. C., show the self-hardening quality, their surfaces being glass hard.

The chapter on tempering, as the word is usually employed (meaning hardening and drawing) is especially instructive and interesting, the more so as it is enriched with numerous tables showing the physical properties of various kinds of steel, each with various percentages of alloy.

Balls and rings for bearings get a chapter for themselves. Magnet steels, for both permanent and electro magnets, are taken up in detail. There is a very good section on ball-valve steels.

Taking it by and large, this little book is better worth its cost than nine out of ten of the technical works that have come under the reviewer's observation for a long time.

How to Test and Grade Foundry Sands

Standard and Tentatively Adopted Methods of Testing and Grading Foundry Sands. (1928). Pages 94, 6 x 9 in.; illustrations, 31, paper covered. Published by American Foundrymen's Association, 222 West Adams Street, Chicago. Price, $3.

This publication is a revision of the foundry sand test methods issued by the joint committee on molding sand research in 1924, and contains in addition descriptions of testing procedures developed since 1924.

Controlling specifications are given, with general information as to methods of conducting tests and details of construction of apparatus which has been found satisfactory for performing the tests.

The book is divided into five sections: (1) Foreword; (2) Standards; (3) Tentative Standards; (4) List of Manufacturers of special testing apparatus; (5) Bibliography.

New Books Received

Standards and Standardization. By Norman F. Harriman. Pages 265, 6 x 9½ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, $3.

The Sales Engineer. By Gilbert Rigg. Pages 112, 5 x 7¾ in. Published by Mining Publications, Ltd., 724 Salisbury House, London, E. C. 2, England. Price, 10s.

Practical Industrial Furnace Design. By Matthew H. Mawhinney. Pages 318, 6 x 9¼ in., illustrated. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. Price, $4.

The Mineral Industry during 1927. Edited by G. A. Roush. Pages 766, 6½ x 9½ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $12.

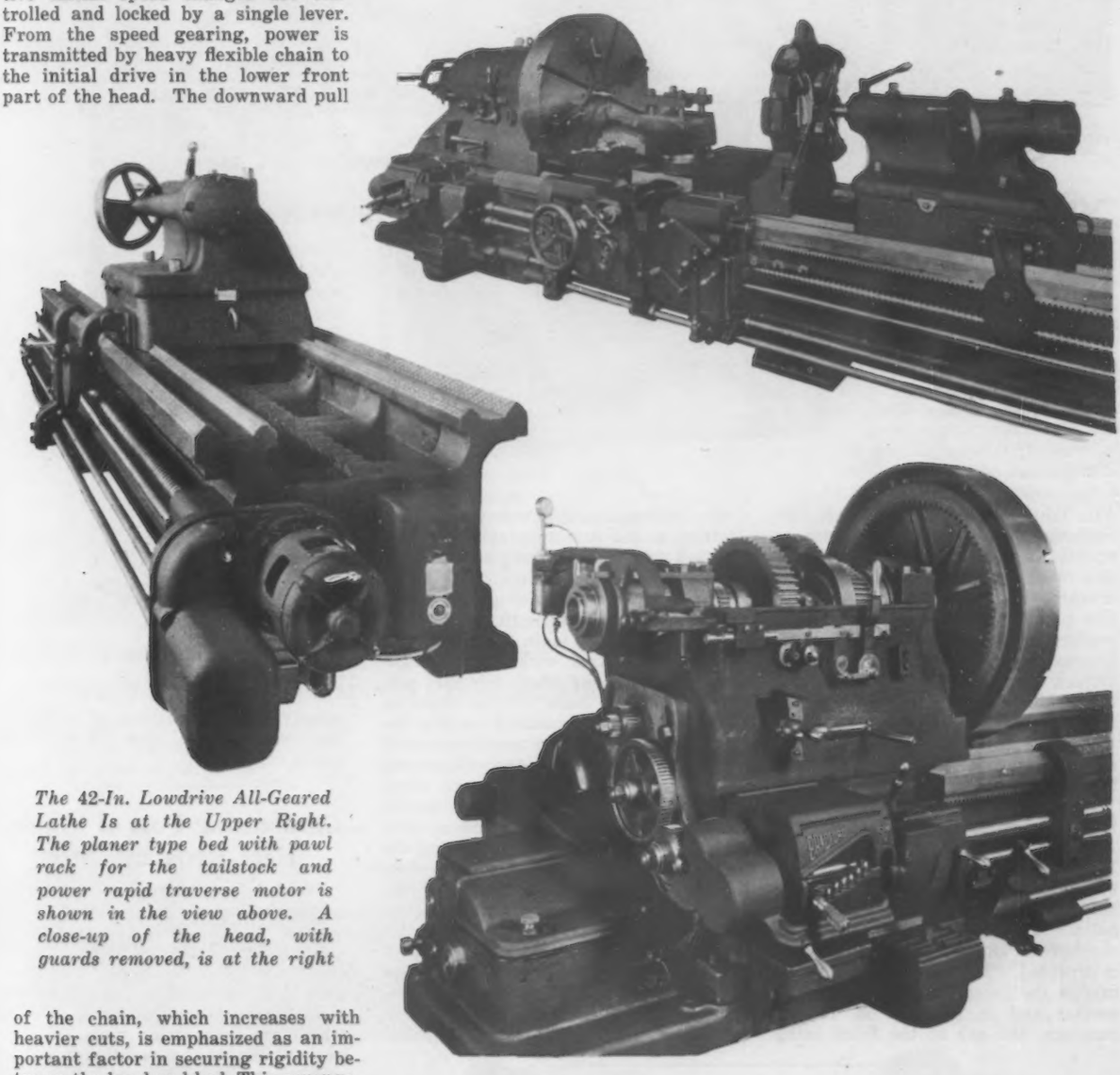
Théorie, Calcul et Construction des Cheminées d'Usine. By E. Lafon. Pages 176, 6¼ x 9¾ in., illustrated. Published by Librairie Polytechnique Ch. Béranger, 1 Quai de la Grande Bretagne, Liége, Belgium. Price, 50 fr.

The Work of the International Labor Organization. Pages 197, 6 x 9¼ in. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, $2.50.

New 42 and 48-In. All-Geared Motor-Driven Lathes

UNUSUALLY heavy all-geared transmission is a feature of a "Lowdrive" lathe of completely new design which has been brought out by the Bradford Machine Tool Co., Cincinnati.

The unusually heavy all-geared drive is made possible by placing about two-thirds of it under the head and down in the bed where six selective initial speed changes are controlled and locked by a single lever. From the speed gearing, power is transmitted by heavy flexible chain to the initial drive in the lower front part of the head. The downward pull of the chain, which increases with heavier cuts, is emphasized as an important factor in securing rigidity between the head and bed. This arrangement is patented.



The 42-In. Lowdrive All-Geared Lathe Is at the Upper Right. The planer type bed with pawl rack for the tailstock and power rapid traverse motor is shown in the view above. A close-up of the head, with guards removed, is at the right

In addition to the spindle, the head itself carries a back-gear drive and a triple or faceplate drive, as well as a direct spindle drive. The construction permits use of a tumbler in the head for the "feeds" and "threads," as well as a mechanism having two coarse screw ratios (4 and 20) which materially increases the thread and feed range listed on the regular index plate. A lead of 20 in. is regularly available. Eighteen spindle speeds, forward and reverse, ranging from 1½ to 175 r.p.m. are obtainable. A spindle brake acts automatically when the drive to the spindle is disengaged. The faceplate drive is controlled by a large lever which moves the engaging pinion into or out of mesh with the internal face gear. With this drive engaged, the operator uses the apron control to start, stop and reverse the lathe spindle.

Power rapid traverse is available for traversing the carriage in either direction along the bed, for the carriage cross-feed screw and tool rest, and for the angular feed to the compound rest top. This traverse is engaged simply by holding down a lever on the carriage until the required movement has been effected. The independent motor on the bed, at the tailstock end, provide for all power traverse requirements. It is impossible to engage the power rapid traverse until the power feed has been so engaged and vice versa.

Oiling of each bearing is automatic, fresh oil being supplied according to the requirements of the different bearings. The system includes an automatic oil-pressure accumulator which discharges oil at a pressure of about 300 at fixed intervals as long as the lathe is running.

The lead-screw is 2 7/16 in. in diameter and has one thread per inch. Being used for thread cutting only, it is not splined. The lead is guaranteed to be accurate within 0.001 in. in 18 in. for the full length of the thread. Screw cutting and power feeding cannot be in simultaneous engagement. The quick-change gearing for obtaining the various threads and feeds is of the company's standard design.

A 25-hp. constant-speed motor which runs continuously in one direction is usually furnished for the machine. Starting and stopping of the motor is from a push button station on the head, or at one or more other places on the machine if desired. Independent starting, stopping and reversing of the lathe is effected by a

(*Concluded on page* 1474)

Face Milling Machine Adapted for a Variety of Work

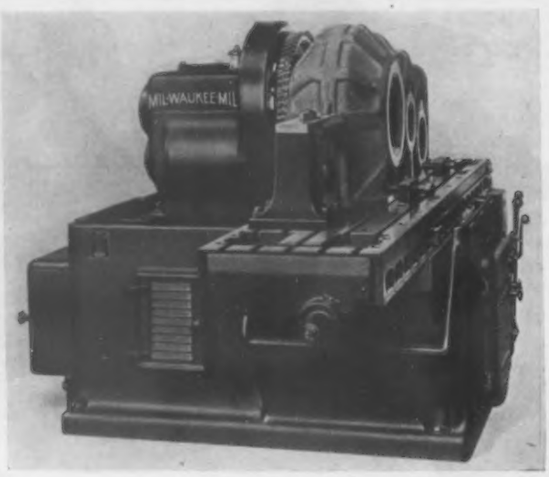
KEARNEY & TRECKER CORPORATION, Milwaukee, Wis., has added to its line of Mil-Waukee-Mils the new Broadside here illustrated. Like other Mil-Waukee-Mils, this machine is built on the unit plan and may be adapted for a variety of production face milling jobs.

The new machinery has for its foundation the standard Simplex and Duplex Mil-Waukee-Mils described in THE IRON AGE of Sept. 15, 1927. By replacing the standard horizontal spindle head on a Simplex with the new face milling head the Simplex machine becomes the Broadside. In like manner two of these heads may replace the standard heads on the Duplex, or, if desired, just one of the Duplex heads may be replaced. Like other Mil-Waukee-Mils the new machine can be furnished with either 14 in. or 22 in. width tables and with seven power feeds ranging from 2 to 11 ft.

Cutters up to 24 in. in diameter may be used. The head is fitted with the new standardized spindle nose. The larger diameter cutters are driven by clutch keyways with the cutters held to the faceplate by means of bolts. Timken bearings are used throughout and automatic lubrication is provided. The main spindle, which carries the faceplate, is 5⅜ in. in diameter and is mounted in Timken bearings, the one at the front being 8½ in. in diameter and the one at the rear 6 in. On the rear of the faceplate and integral with it is a 4 pitch 20½-in. diameter internal gear with 82 teeth. This gear is driven through a shaft and pinion and large spiral bevel gears and the ratio of the drive pinion to the internal gear is approximately 8 to 1.

A feature is the use of flywheels in the cutter drive. It will be seen from the accompanying sketch that, in addition to the driving pinion shaft, *A*, which drives the internal gear, there is an auxiliary free running shaft, *B*, driven by the internal gear. Both shafts carry flywheels that revolve at eight times the main spindle speed. It is stated that with this arrangement the driving shaft flywheel prevents "kicking back" of the cutter as each tooth of the cutter bites into the metal; similarly the auxiliary shaft flywheel prevents the "jumping ahead" of the cutter as each tooth leaves the cut. The two flywheels thus maintain a neutral action, with one set of forces counterbalancing the other, the result being smooth flow of power at the periphery of the cutter. Twelve spindle speeds, ranging from 6 to 60 r.p.m., are obtainable by means of pick-off gears. The head cannot be furnished with quick-change gears. Eighteen changes of feed, obtainable either by pick-off gears or quick-change gear box, are provided.

Use of Flywheels in the Cutter Drive, Shown in the Line Sketch Above, Is a Feature of the Broadside Face Miller



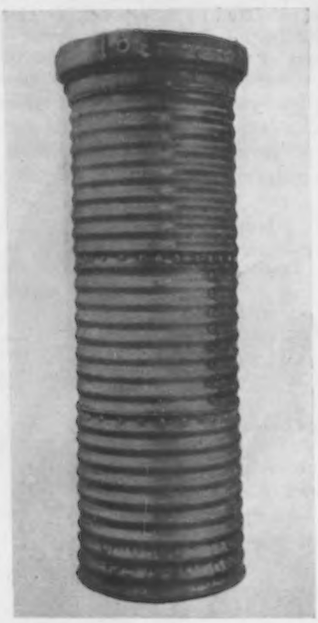
Annealing Pot of Stainless Iron Welded to Steel

STAINLESS iron, welded, forms the Fuzon annealing pot, made by the Chicago Steel & Wire Co., 103d Street and Torrence Avenue, Chicago. Annealing with this new pot is said to cut time and cost almost in two. The pot, which weighs 660 lb., takes the place of a cast steel pot weighing 3300 lb. Each pot holds about 2000 lb. of wire. Consequently, when annealing wire in the new stainless iron pot, it is necessary to heat only 2660 lb. of metal, whereas with the old cast steel pot 5300 lb. of metal must be heated.

At the annealing point of wire, 1350 to 1400 deg. Fahr., this stainless iron shell has scarcely taken color. Consequently there is no sign of scale over its surface or interior. Because of the rapid scaling action that takes place when heavy cast steel pots are heated and cooled, the metal in them has to be so thick that they will last some time. With stainless iron pots the life should be almost indefinite.

The Fuzon annealing pot is about 7 ft. high and has an outside diameter of about 24 in. The body of the pot is made of 14-gage stainless iron, 18 per cent chromium with 8 per cent nickel. It has a wrought steel base plate ⅞ in. thick and a wrought steel collar on top, about 1 in. thick. Eight carbon steel rods, ½ in, in diameter, are welded to the collar and to the base to take the lift. A steel plate is welded inside of the pot, so that the coils of wire may easily be removed and will not be caught in the corrugations of the outside shell.

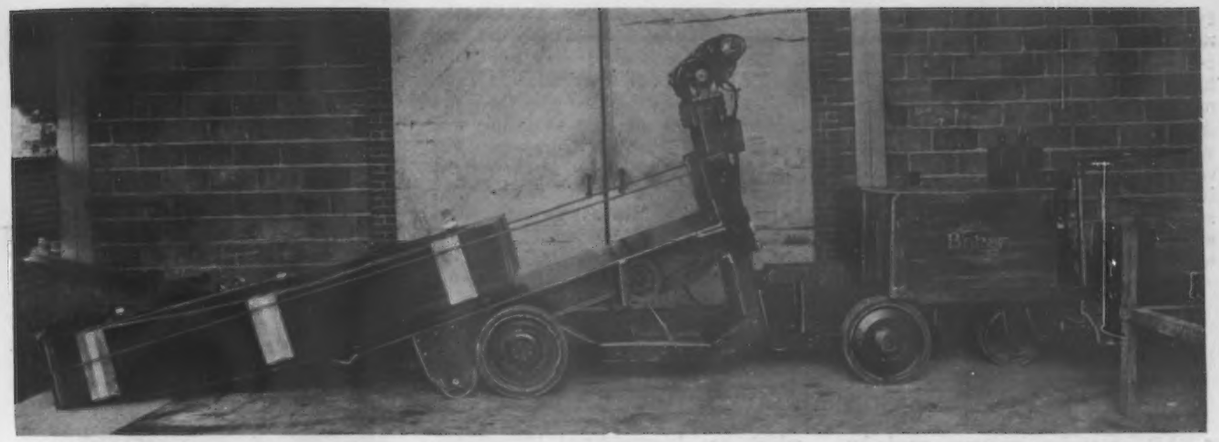
The shell of the pot is first formed and riveted, the riveting being primarily for the purpose of retaining the proper shape, and not to afford extra strength.



Welded Annealing Pot of Stainless Iron

Carbonizing Pots of Welded Heat-Resistant Steel

Welded pots for case hardening and annealing are being placed on the market by Mossberg Pressed Steel Corporation, Attleboro, Mass., under the trade name Mephisto. The company has produced a line of welded steel products since 1920, among which are vulcanizing pans. To improve upon the conventional galvanized pan, a special steel has been used, capable of resisting corrosion due to the sulphur and steam from the rubber compounds. Such construction also calls for special welding rod and technique, so the joints may be equally resistant. During experiments designed to improve this material even further, an alloy and welding process was discovered which has resisted oxidation at 1800 to 2000 deg. Fahr. Comparative tests show that a welded pot of Mephisto metal acquires merely a thin, tightly adherent scale under conditions which would destroy a similar pot made of 3/16-in. boiler steel plate.



Baker Articulated Tilting Truck Will Load Approximately 500 Tons of Sheets in a 10-Hr. Day, Putting a Package Weighing from 6 to 10 Tons in a Car in 10 or 12 Min.

Truck Loads Steel in 10-Ton Packages

AFTER more than a year of development work, the Baker-Raulang Co., Cleveland, has put on the market an electric storage battery truck which will load 10-ton packages of sheet steel into box cars without danger of breaking through car floors.

The new truck is known as the Baker type D-96 articulated tilting truck. It is articulated, or hinged, in the center. This hinge enables it to make the very short turn from the loading dock through a 6-ft. car door with a package as large at 48 in. wide and 102 in. long. In operation this truck is like a one-horse wagon, if the horse were turned around in the shafts and faced the wagon.

The power section carries the battery and the driving and steering apparatus. The load section consists of a tilting platform mounted on a single axle and includes the hoist for tilting the platform and a double drum power winch.

Sheets which are to be handled by the Baker truck should be provided with 2 x 4-in. wood skids and firmly strapped together. The truck will pick such a package up from the floor, but in order to handle the maximum tonnage the packages should be placed on the truck platform by means of an overhead crane. The steel is usually weighed just before it is loaded, and when the crane picks it up from the scale the truck platform is run underneath. The truck then carries the load from the scale and places it in the car. Under such conditions, and making ample allowances for delays, the truck will load approximately 500 tons of sheet in a 10-hr. day, putting a package weighing from 6 to 10 tons into a car in from 10 to 12 min. In tests packages have been repeatedly loaded into cars within 6 min., but in regular operation delays will nearly double this.

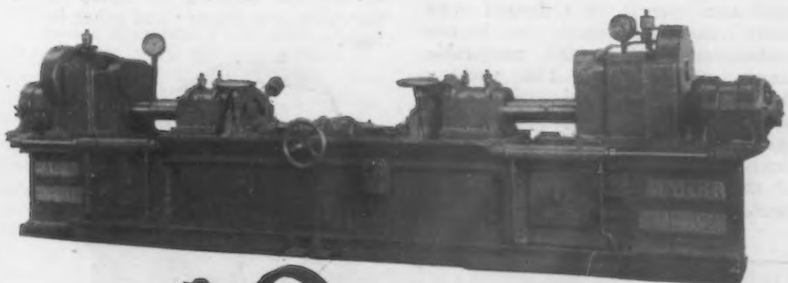
Under the present system, two men will load approximately 80 tons of sheet per day by hand. Accordingly, this truck, with an operator and a helper, will replace 12 men and will eliminate damage to the sheets as a result of scratching or rusting. Sheets larger than 48 x 102 in. can be handled, but automobile cars with 10-ft. door widths are required.

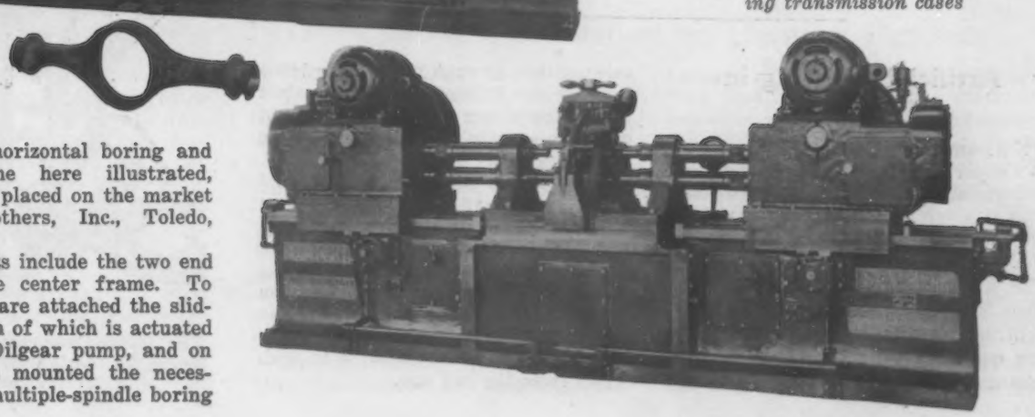
Hydraulic-Feed Horizontal Boring Machines

UNIT plan of design to permit adapting the machine for a wide range of work is a feature of the hydraulic-feed horizontal boring and drilling machine here illustrated, which has been placed on the market by Baker Brothers, Inc., Toledo, Ohio.

Essential units include the two end frames and the center frame. To the end frames are attached the sliding saddles, each of which is actuated by a separate Oilgear pump, and on the saddles are mounted the necessary single or multiple-spindle boring or drilling heads. The center frame is made in various lengths according to the work-holding fixture required.

The main heads are driven by individual motors mounted either on the heads or the saddles, as shown. The feed, which is controlled by foot pedals at the front of the machine, has the characteristic rapid advance and return of the Oilgear device and also the infinite number of adjustments of rate of feed. Use of two hydraulic pumps, one for each end of the machine, is emphasized as simpli-





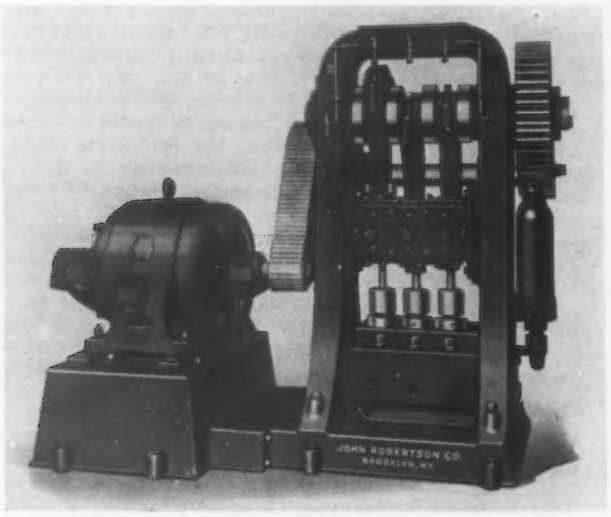
The Single-Spindle Machine for Boring and Counterboring Rear Axle Housings Is at the Left. The machine below is for boring transmission cases

fying the piping and eliminating the necessity for an equalizing mechanism. A pressure gage on each hydraulic pump permits checking abnormal operating conditions, such as dull tools, undue hardness of material, incorrect chucking, etc., which conditions are indicated by the building up of high gage pressure. The saddles slide on unusually wide scraped ways and are proportioned to assure rigidity and alinement.

One of the machines illustrated is fitted with two spindles in each head and with fixture and support for two boring bars for boring two holes in an automobile transmission case. In this installation two machines are employed, one for the roughing and one for the finishing operation. The second illustration is of a single-spindle machine with fixture for boring and counterboring cast steel truck rear axle housings. The machine is designated as the No. 25 H. H.

High-Pressure Continuous Service Pump

LEAD extrusion presses, used by rubber hose manufacturers for lead incasing hose previous to vulcanizing and by electrical wire and cable manufacturers for incasing cables, require hydraulic pumps that will continuously deliver a large volume of water at high pressure. The hydraulic pump illustrated, built by John Robertson Co., 131 Water Street, Brooklyn, is designed for such continuous service and is furnished in sizes up to 50 gal. per min. and for working pressures up to 6500 lb. per sq. in.



Hydraulic Pump for Lead Extrusion Presses and Other Continuous High-Pressure Use

The pump has a steel shaft with large diameter eccentric bearings which are bronze lined throughout. The main bearings are babbitt lined and the eccentric and main bearings are lubricated automatically from a 2½-gal. oil reservoir. The knuckle joints are bronze lined and work in oil. The plungers are of "non-rust" steel and operate in a forged steel pump chamber which is bronze bushed and fitted with removable bronze valve seats. The packing chambers are deep and easily accessible. Each pump is equipped with a hydraulic safety relief valve of sufficient capacity to relieve full discharge of the pump without a substantial increase in pressure.

Artificial Lighting in Industry

IN a pamphlet dealing with the use of Cooper-Hewitt lamps for lighting industrial buildings, much information is given on the subject of vision, its acuteness and its importance in the question of industrial lighting. The utility of producing sharp outlines is stressed, as this increases the contrast between surfaces. Examples are quoted in which this element has meant a definite industrial improvement, either through a saving in labor costs or the turning out of a product containing fewer minute defects not discernible unless lighting conditions are particularly good.

It is stated that the yellow and green light rays constitute the best *seeing* rays in the entire spectrum, and these rays are said to form 90 per cent of the total rays emanating from the Cooper-Hewitt light. The remaining 10 per cent comes from the blue and violet end of the spectrum, while none whatever, it is said, comes from the red end.

Goggles With Helmet Attachment

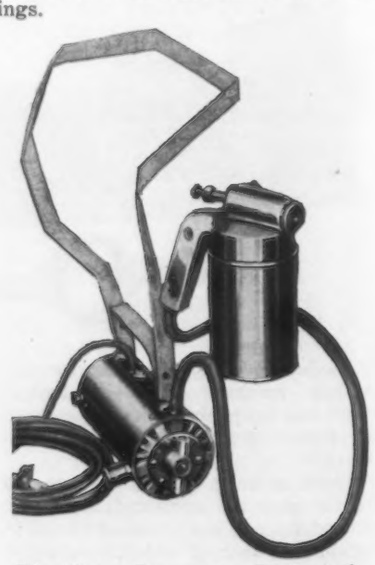
GOGGLES attached to a skeleton helmet by fiber links have recently been added to the line of equipment for oxy-acetylene welding, manufactured by the Oxweld Acetylene Co., New York.

The goggles can be readily raised over the forehead or lowered over the eyes with one hand; the bridge is adjustable and is covered with rubber insulation. Replaceable lenses, in standard size and colors, are used, the colored lenses being protected by cover lenses of clear glass. In another style the lattice skeleton cap is replaced by a fiber helmet, protecting the entire top of the head adequately. Both styles have leather adjusting straps at the rear.

Skeleton Helmet with Goggles Attached

New Paint Spraying Outfit

THE Weil Lectrospray, a new electric spray painting device developing sufficient air pressure to spray liquid finishes, is being manufactured by the Weil Machine Co., Detroit, for economical painting or spraying in factories, warehouses and other buildings.



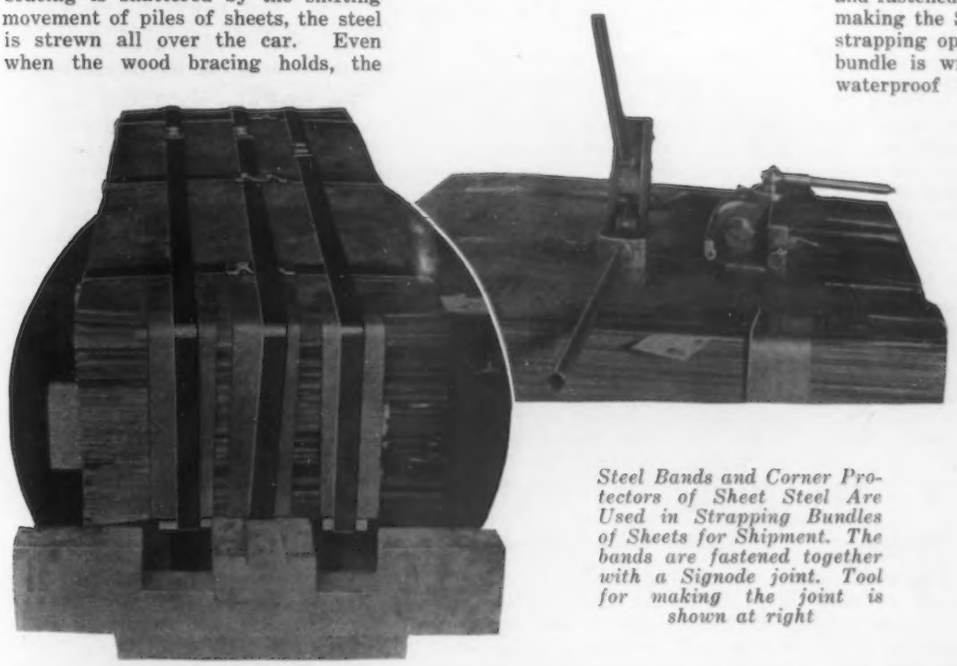
The Motor-Compressor Unit of the Spraying Outfit May Be Slung Over the Shoulder

The motor-compressor unit may be slung over the shoulder with the strap provided or it may be set on a bench or on the floor. This arrangement thus represents a departure from the usual practice in this type of gun.

By plugging into an electric light socket and snapping the switch, pressure is generated by the motor-compressor. The density of the spray is controlled by an adjustment of the nozzle.

New Method of Bundling Sheets for Shipment

STEEL sheet, especially full-finished automobile sheets, have been one of the most troublesome commodities handled by the railroads. When wood bracing is shattered by the shifting movement of piles of sheets, the steel is strewn all over the car. Even when the wood bracing holds, the shifting of the piles of sheets—which vary greatly in length—is sufficient to cause the shorter sheets to shuffle back and forth, resulting in scratching and curling up at the ends. As a consequence, many sheets have had to be returned to the mills for reconditioning.



Steel Bands and Corner Protectors of Sheet Steel Are Used in Strapping Bundles of Sheets for Shipment. The bands are fastened together with a Signode joint. Tool for making the joint is shown at right

About a year and a half ago, some of the mills, with the cooperation of the Consolidated Steel Strapping Co., 2600 North Western Avenue, Chicago, started experiments intended to do away with wood bracing by bundling the sheets with steel bands and allowing the unit to shift in the car. Progress was made, but without solving the problem.

The Fisher Body Corporation, Detroit, also began experimenting, using 2-in. x 16-in. gage bands and loading the bundles in gondola cars instead of box cars. The bundles were lifted into gondola cars by crane and covered with waterproof paper to protect the sheets from the elements. These shipments arrived in such excellent condition that the Fisher company decided to have all of its shipments made in this manner.

Bundles 20 in. high were put up with three cross bands around the steel only; 2 x 4 skids were strapped to the bundle with two or three longitudinal bands. Corner protectors made of sheet steel (about 6 x 6 in.) were placed under the band at each corner. There was difficulty, however, in stretching and fastening the ends of the bands, and after working on several methods of fastening it seemed that welding was the only satisfactory means of fastening the ends; but welding required an experienced welder, and trouble was encountered because of heat going down through the top sheets.

The Consolidated Steel Strapping Co. then developed a simple stretcher and tool for making the Signode joint on a 2 x 0.050-in. band. After making several test shipments to the Fisher body plants, permission was obtained from that company for the mills to use this new Signode equipment.

The Fisher Body Corporation limits bundles to 20 in. high, for convenient handling, and the average bundle weighs from 15,000 to 16,000 lb. Two 2 x 4 skids, running lengthwise, are used to allow the bundle to shift; otherwise the bundle would stick on the bottom and the top of the bundle would slide. Three crosswise straps are placed next to the steel, and the lengthwise straps are put on over the 2 x 4 skids. These bands are 2 x 0.050-in. material, tightened with a special "heavy duty" stretcher and fastened with the special tool for making the Signode joint. After the strapping operation is completed, the bundle is wrapped with Sisal Kraft waterproof paper, and then loaded by crane on gondola cars.

While gondola loading costs are higher per car than box car loading, the cost per ton is said to be just about the same, due to increased efficiency of handling in the mills by reason of strapping large bundles. For example, a bundle weighing 20,000 lb. can be strapped and covered just about as cheaply as one weighing 8000 lb. From 100,000 to 140,000 lb. can be loaded in a gondola, but only 80,000 to 90,000 lb. in the average box car. Advantages claimed for the Signode method are that it delivers material in better condition; saves handling, which eliminates scratches; cuts down loading costs at destination; saves railroad equipment; cuts down claims on railroads, and reduces the amount of material rejected.

Some receivers request strapped shipments in box cars. Some of the bundles are strapped the same as for gondola loading, and some are loaded crosswise of the car. In crosswise loading the steel is strapped in small units of 4000 to 6000 lb., and five or six of these small units are strapped together with two or three bands into one large unit in each end of car.

To Control Combustion on Heating Furnace

THE Carnegie Steel Co. is having the American Heat Economy Bureau, Inc., install on one of the heating furnaces at its Duquesne works automatic control equipment for regulating the combustion of fuel in the furnace. Such control has established its value in a recent installation on a slab heating furnace, the heated slabs from which showed a very thin, uniform scale, which readily broke off at the rolls. The flame in the furnace is merely a haze at the rear.

Serious difficulty previously had been encountered in operating the furnace. At times so much gas was fired that it burned at the stack or excessive scaling occurred, impairing the quality of the finished product. The automatic control is designed to admit only the desired amount of air to the furnace for the fuel fired and maintains this condition for all rates of firing. Under such uniform conditions, the scale loss on heating furnaces is reduced one-half or more, it is stated, while the fuel consumption is maintained at a minimum, dependent on the furnace design and the character of the steel heated.

Mileage Scale Attacked by Shippers

Proposed Freight Rate Changes on Iron and Steel Products Objected to by Mills, Partly on Ground That New Tariffs Would Be Unreasonably High

WASHINGTON, Dec. 4.—The recent report of Examiners Howard C. Faul and C. M. Bardwell recommending a mileage scale of rates on iron and steel products throughout Official Classification territory was attacked by steel producers, consumers, Chambers of Commerce, railroads, port authorities, and others in briefs of exceptions filed last week with the Interstate Commerce Commission. A principal objection was that the scale carries levels of rates that are too high. But this objection was not voiced by the Chicago and related districts. Protests also were made against suggested rates for short hauls, especially by producers in the Middle West districts; proposed changes in relationships, the arrangement of mileage blocks, the maintenance of present differentials on eastbound traffic from Johnstown, Pa., and Cumberland, Md., and other points. Arguments probably will be heard before the commission the latter part of this month.

Steel Corporation an Objector

United States Steel Corporation subsidiaries filed exceptions to six recommendations. They objected to the conclusions of the examiners that the "level of the rates on iron and steel is of much less importance to shippers generally than is their relationship;" that "the principle of what the traffic can or will bear is a factor which must be given due weight;" that "the evidence is persuasive that, with certain exceptions * * *, rates on manufactured steel should be uniform or level throughout the territory under consideration;" that the scale to be adopted as a maximum reasonable rate scale be applied to the interstate transportation of iron and steel articles; that "in view of the peculiar conditions existing at Johnstown (Pa.) and Cumberland (Md.) * * * no objection be interposed to the retention of the present differentials on this traffic eastbound provided the same differentials are established on westbound traffic;" and that no origin grouping should be authorized in connection with hauls of approximately less than 150 miles.

Discussing the first exception it was contended that it was proved conclusively that the rates were unreasonably high. Ignoring the weight of the testimony showing the unreasonableness of the general level of the short haul iron and steel rates in the middle district, the brief said, the examiners start the scale at 6c. per 100 lb. Manifestly, it was urged, they have overlooked the controlling fact that there are different traffic and transportation conditions existing within the Pittsburgh district, Mahoning and Shenango Valleys, Cleveland-Wheeling territories * * * which would justify a lower scale for this short-haul territory than that recommended for general application.

It was also pointed out that the examiners overlooked the important fact that the Monongahela, Allegheny and Ohio rivers afford to shippers in the Pittsburgh district a means of water transportation available throughout the entire year at rates appreciably lower than the scale recommended and that the establishment of such a scale in that district would drive away from the rail carriers the traffic which they are now enjoying at highly compensatory rates, with the consequent decrease in the carriers' revenues. It also should be remembered, the brief said, that the present scale of rates in the Pittsburgh, Mahoning-Shenango Valley, Cleveland-Wheeling districts are presumably now on a reasonable basis.

Claims Rates Would Be Unreasonably High

Excepting to the recommendation that "the principle of what the traffic can or will bear is a factor which must be given due weight," the brief said this contention is grounded on the fact that the examiners have ignored the element of reasonableness and have proceeded upon the false premise that the iron and steel traffic can bear unreasonably high rates, notwithstanding that during the course of the discussion they hold "it is the commission's duty in this proceeding to fix reasonable rates on steel." The brief sets forth a part of the scale proposed to support the argument that it would have the restrictive effect of long-haul rates. It is pointed out that over 62 per cent of the movement of steel is for hauls less than 300 miles and that when the length of the hauls from Pittsburgh to the large consuming markets in the East is reached the percentage of the longer movement is much less. It was declared that the short-haul rates in the middle district should not be increased because of the water competion situation and that they are more than amply compensatory, and finally that the long-haul rate from that district should be reduced because the traffic is not moving freely thereunder.

Regarding the recommendation that the rates on manufactured steel should be on a uniform level throughout Official Classification territory, the brief urged that consideration should be given to the transportation, commercial and competitive situation peculiar to the short-haul movement of iron and steel articles in the Pittsburgh and adjacent territory and that reasonableness should not be sacrificed for uniformity.

Scale Declared Unscientifically Drawn

The brief also maintained that the scale is unscientifically drawn. It was declared to be entirely too high in that the rates of progression are too rapid. Attention was directed to the fact that the rate for the first block, which is fixed at 6c. per 100 lb., was 20 per cent of the first class rate proposed for the first block in the Eastern Class rate case. Dealing with the proposed maintenance of differentials on eastbound traffic from Johnstown and Cumberland, the brief inquiries as to why the differential relationship should be preserved to Johnstown and be denied to all competitive districts.

The finding that no origin grouping should be authorized in connection with hauls approximately less than 150 miles, the brief said, would work considerable injury to the competitive mills in the middle district, which have been developed under long established rate groupings on short-haul traffic, unless practical exceptions are permitted so as to mold the scale to fit into the exigencies of trade and commerce. The brief expressed the view that the establishment of groups on traffic involving distances under 150 miles would be in the public interest, but that such groups should be a matter of conference between the carriers and the industries involved, with the proviso that no carrier should be permitted to take out of the prescribed group a particular industry and accord to it a preferential rate, "such as the trunk line carriers in the Philadelphia steel producing district have been according to the favored competitor on traffic moving to the large metropolitan consuming district."

The brief made no objection to the retention of the Pittsburgh group as now constituted, provided that Pittsburgh is used as a central point from which to determine the mileage. But if the mileage from the Pittsburgh group is to be constructed on the average from all points in the augmented group, the brief said, exception will be taken to including Wheeling and related points.

Jones & Laughlin's Objections

The Jones & Laughlin Steel Corporation, Pittsburgh, made seven objections to the recommendations. It contended that the rates for long

hauls are unduly high in their relation to rates for short hauls under the proposed scale; that the level of rates in the scale for hauls in excess of 100 miles is unreasonable; that the level for hauls of less than 50 miles is unreasonable; that points in Ohio and West Virginia now included in the Pittsburgh group should not be constituted into a separate group; that the rates recommended do not give effect to the findings of fact; that the examiners erred in failing to recommend a scale having the progression and level of the scale proposed by F. A. Ogden, traffic manager of the Jones & Laughlin Steel Corporation, and that the scale proposed from five miles and under to 800 miles should not be adopted.

Objection was made to the scale because it names rates for the longer hauls, over 300 miles, that are unduly high in relation to the rates for shorter hauls, under 100 miles. The rate of progression was declared to be too high and the rates to increase too fast for successive distances or mileage blocks. It was contended that the purpose and effect of the scale is to prevent the middle district from shipping to or beyond the other districts, to keep the middle district out of the Atlantic seaboard market and West Coast business available by water only through seaboard, and also out of the St. Louis and Mid-Western market and other territory beyond whose rates base on Chicago or the Mississippi River. It was stated that the "blow dealt the (United States Steel) Corporation by the examiners hit also the middle district independents, including these exceptants." The net result of the scale, it was said, would be to reduce aggregate revenues by less than 5 per cent; that the reductions would fall more to the short haul traffic than to long haul, and that the scale accomplishing the reductions shall progress from 60 per cent of the Central Freight Association fifth class rate at five miles to 100 per cent of fifth class at 480 miles. In its exception that the level of rates for short hauls of less than 50 miles is unreasonable, the brief said that, with one-fifth of the total traffic moving less than 40 miles and a proposed increase thereon of about 40 per cent, it seems clear that some provision should be made in the final decision to take care of the short movements, 40 miles and less, taking place within so-called and arbitrary switching limits or elsewhere.

The proposed separation of Weirton and Wheeling, W. Va., from the Pittsburgh group, it was stated, would simply throw them ½c. or 1c. out of line with the familiar Pittsburgh rate basis. Quotations, it was declared, would under pressure of competition have to be made, as they are now, in contemplation of the Pittsburgh base price and freight rate. The ½c. or 1c. difference, it was contended, necessary to take into account on quotations, would be more hindrance and nuisance in the routine of selling and accounting than the money would be worth to the railroads. Finally, it was declared that the proposed scale, or any other scale embodying full class rates for long hauls, and a substantially lower level of rates for short hauls, "will fail to remedy the discrimination or correct the unreasonableness of the present rates from Pittsburgh."

Valley Producers also File Exceptions

Steel manufacturers in the Mahoning and Shenango Valleys excepted to the report because of its failure to include certain sections in the territory involved, such as a section of Kentucky and Lake Michigan points reached by way of cross-Lake routes; because of its failure to carry fully into effect facts which, it was stated, warrant a lower rate scale than the basic scale and because of proposed maintenance of differentials on eastbound traffic from Johnstown and Cumberland.

The basic scale proposed was declared to be too high for both the long and short hauls. It was contended that a mileage scale should start at a lower figure than 6c. because of the existing short haul rate situation in the important iron and steel producing districts of Pittsburgh, Wheeling and Chicago and because of the competitive relationship between the iron and steel industries located in switching districts and industrial districts. The brief urged adoption of the Rhodehouse scale, which starts at 3c. and progresses at an increase of ½ cent for each five-mile block, reaching the rate of 92.5c. for the 66 to 70-mile block, which is the present intrastate rate between Youngstown and Cleveland. The Youngstown interests, objecting to maintenance of the Johnstown and Cumberland differentials, asked application of the mileage scale basis from all producing points without exception.

Objection was made to any fourth section relief which will permit the direct lines by way of the Western gateways to publish a lower basis on iron and steel in carloads from Pittsburgh than from Younstown to the Virginia cities and to points located on the Chespeake & Ohio and Norfolk & Western railroads intermediate to the Virginia cities by way of the Eastern gateways. But whatever scale is prescribed, it was said, should be applied from Pittsburgh by way of the Eastern gateways and should not be equalized by the Western gateways, unless at the same time the same basis of rates is accorded the Valleys as is accorded Pittsburgh by way of direct routes through the Western gateways.

It was also urged that no change be made in the present rail-Lake and rail-Lake-rail rates to Duluth and the Twin Cities, regardless of the rate basis which may be prescribed within official territory. To permit the carriers to advance the rates to Duluth and the Twin Cities, it was said, would result in changing the competitive relationship of Youngstown and other interior points in official territory with other producing districts, such as the Chicago district, to the destination territory, which is outside the scope of the proceeding.

Illinois-Indiana Shippers Also Object

Manufacturers and consumers in the Illinois-Indiana territory, through the Illinois-Indiana Shippers' Steering Committee, took exception to the proposed grouping and declared that the commission should reaffirm the principle of grouping as stated in the Jones & Laughlin rate case, which, in effect, provides that rates from and to each group, in the aggregate, average substantially the same as if made from and to each point separately. It was suggested that the establishment of groups of points of origin and groups of points of destination should in the first instance be left to the carriers, and that as to the making of rates to and from Milwaukee, which have always been made on an arbitrary over the Chicago rate, they should be continued to be made on that basis.

The Indiana State Chamber of Commerce, representing numerous producers and consumers in Indiana, excepted to the scale and submitted one of its own, providing a rate of 6c. for five miles and under up to 51.5c. for 1200 miles. The scale is carried in five-mile blocks up to and including 70 miles at a rate of progression of 10c. for each 100 miles. At 70 miles the scale is broken in 10-mile blocks up to and including 160 miles at a rate of progression of 5c. for each 100 miles on the theory that hauls for distances in excess of that are handled largely by through freight trains and the scale would be broken at a rate of 4c. for each additional 100 miles up to and including 500 miles.

In so far as iron and steel are concerned, the brief said, the Pittsburgh interests are striving to get into certain portions of southwestern Indiana and into Illinois in competition with producers located in the Indiana-Illinois territory. Here, it was stated, the element of competition should tend to decrease further the rate of progression, so beyond 500 miles the scale would be broken so that the rate of progression would be 3c. for each 100 miles. Under this scale, it was declared, consumers in certain portions of Indiana and Illinois would have the privilege of purchasing their steel in a highly competitive market.

[Briefs have been filed, also, by producers in the Philadelphia and Buffalo districts, by the Cleveland Chamber of Commerce, Milwaukee Iron and Steel Committee and others, and these will be summarized in the issue of Dec. 13.]

Directors of the General Fireproofing Co., Youngstown, have called a special meeting of stockholders on Dec. 4 to consider a plan for the exchange of the old common stock of the company for new stock on a four for one basis. The plan will necessitate increasing the authorized common shares from 200,000 to 500,000.

Operation of Stevens Steel Furnace

Open-Hearth Unit, Insulated and Incased in Steel, Is Subjected to Close Oxygen Control

WHEN the conditions are met that give the greatest thermal efficiency in the open-hearth furnace, a neutral atmosphere is automatically produced, and the furnace pressure is automatically made constant. It must be remembered that a neutral atmosphere depends upon the correct ratio of air to fuel, and any variation in furnace pressure causes a variation in volume of air induced. A neutral atmosphere improves metallurgical conditions, resulting in a greater yield and better steel.

According to a statement by Arthur L. Stevens, president Arthur L. Stevens Corporation, 205 West Wacker Drive, Chicago, the Stevens furnace is designed to meet these conditions. Regenerators are of a form and capacity, based upon data regarding heat absorption by brick and time of reversal, that give the maximum heat recovery and highest air temperature possible. All of the air for combustion is sent through the regenerators; this is done independently and is in no way related to stack draft. Stack draft is used only to take away the waste gases produced, and the pressure in furnace over the bath is kept constant at all rates of firing.

Air is supplied at constant pressure and is metered, as is also the fuel, so that the correct ratio of fuel and air is always maintained, and cold, infiltered air is excluded. The flame temperature is raised, which promotes fast melting. And, as the increased economy in the use of fuel and the exclusion of excess air reduce the volume of hot gases, there results a prolonged life for refractories.

Guarding Against Unwanted Air

To carry out this method the Stevens furnace is incased in steel, with specially constructed doors to insure against inward leakage of air. The regenerators are correctly proportioned for maximum heat effect and are insulated and incased in steel. Air supplied by a fan at a constant pressure is passed through an orifice meter, and this charge is calibrated with the fuel supply. Constant pressure is maintained in the furnace atmosphere. This means that high fuel economy is secured and a neutral atmosphere is automatically maintained.

Various patented devices are used in carrying out this plan and a broad patent has been granted for operating an open-hearth furnace with a neutral atmosphere maintained in this manner.

The first Stevens furnace to go into production is said to have cut fuel consumption sharply. The yield was increased and the percentage of pig iron used in the charge was reduced. The quality of steel was improved and the entire cost of installing the complete new furnace was saved in less than one year.

Trade Practice Conference in Chicago December 12

WASHINGTON, Dec. 4.—The trade practice conference of the woodworking machinery industry with the Federal Trade Commission will be held on Dec. 12 at the Sherman Hotel, Chicago. The conference will be in charge of Commissioner G. S. Ferguson. An announcement by the commission said that a majority of manufacturers and dealers will be represented, and it is the desire of the commission and the industry that all others who have an interest in the subject consider themselves invited whether or not they have received an official announcement. Among trade practice proposed for discussion are inducing of breach of contract, fraud and misrepresentation, secret rebates, and price discrimination. Efforts will be made to provide for elimination of unfair commercial practices. The Association of Manufacturers of Woodworking Machinery has drawn up a tentative list of rules which will be submitted.

World's Largest Suspension Bridge Nearing Completion

Construction of the $26,000,000 Detroit-Windsor Ambassador bridge has progressed so rapidly that all of the cable work will be completed this week, according to Robert MacMinn, chief engineer in charge for McClintic-Marshall Co. Fabrication of the stiffening trusses in the central, over-river span, which is 1850 ft. long, will be begun before Jan. 1 and completed by April 1. On the Canadian side, 17 bays of the 29 bays of steel approach have been completed, and work on the Canadian side approach, including concrete, is about 75 per cent completed. On the American side work on two trusses each 140 ft. long, which will bridge Fort Street, Detroit, was begun last week on the ground. When assembled these trusses will be hoisted into place whole, without disturbing traffic on Fort Street. When it is completed, about July 1, 1929, the Ambassador bridge will be the largest suspension bridge and have the longest span of any bridge in the world.

Aircraft Manufacturing to Adjoin Detroit Airport

The Detroit Board of Commerce and the Wayne District Association have announced plans for the organization of a $5,000,000 corporation to undertake the immediate development of the Detroit-Wayne Industrial Airport, a tract one mile square, just outside the city of Wayne, which is 17 miles from Detroit.

Half of the tract will be sold or leased as industrial sites to manufacturers of planes, parts or accessories. The Stinson Aircraft Corporation has already purchased a 10-acre site and has begun construction on a $250,000 plant, which, it is expected, will be completed in 60 days. Other aircraft companies are said to be considering locations at the industrial airport.

Buffalo Scrap Dealers Form Institute Chapter

The seventh chapter of the Institute of Scrap Iron and Steel was organized at a meeting held at the Hotel Statler, Buffalo, Monday evening, Dec. 3, and attended by 60 representative dealers and brokers from western and central New York. The following officers were elected: Charles Bock, president; Sol Morrison, first vice-president; L. Hurwitz, second vice-president; Ben Rosenthal, third vice-president; J. E. Farrell, secretary; Harry Roblin, treasurer; Joseph M. Maher, chairman executive committee.

Use of Blast Furnace Slag in Bituminous Construction

Following several previous publications devoted to use of blast furnace slag, the National Slag Association, Cleveland, has put out Symposium No. 8, "Use of Slag in Bituminous Construction." This is a 60-page pamphlet dealing with application of slag aggregate or slag concrete to the construction of highways and other similar mass engineering projects. Quotations are given from a large number of publications and authorities, showing the requirements for this service, how well the slag fills these requirements, and many other pertinent matters connected with the subject.

Schedule of the next instalment of the ***Business Analysis and Forecast,*** *by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***Dec. 20****—Position of Iron and Steel Producers.*

Pig Iron Freight Rates from Granite City Reduced

WASHINGTON, Dec. 4. — Passing upon a complaint of the St. Louis Coke & Iron Corporation, Granite City, Ill., the Interstate Commerce Commission in a decision made public last Wednesday held that rates on pig iron in carloads from Granite City to certain deliveries in the St. Louis district, to Cape Girardeau, Mo., and to Springfield, Mo., are unreasonable and unduly prejudicial. Rates on pig iron from Granite City to certain other destinations in Central, Western trunk line and Illinois territories were found not unreasonable or unduly prejudicial. These latter destinations included points in Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, Ohio and Wisconsin.

The new and old rates from Granite City in gross tons, to the St. Louis, Cape Girardeau, and Springfield districts, follow:

	New Rates	Old Rates
St. Louis.....	75c.	56c.–$1.23
Cape Girardeau ...	$3.18	$4.26
Springfield	4.00	4.50

The new rates are to become effective Jan. 10. To destinations on the rails of the Terminal Railroad in the St. Louis switching district a rate of 56c. now applies from Granite City for distances ranging from six to 15.5 miles and averaging about nine miles. To deliveries on other lines in the district, the distances from Granite City range from 14 to 22 miles and average about 19 miles. To most of the deliveries in the district on the Missouri Pacific and to at least one delivery in the district on the Frisco Lines a joint rate of 75c. applies. To other deliveries on connecting lines in the district, combinations apply from Granite City, composed of the 56c. rate of the Terminal Railroad, plus the switching charge of the delivering line. These combinations range from 83c. to $1.23. Fourth section violations, which had been complained of through failure to establish certain joint rates, were said by the commission to have been removed.

South African Steel Plant of 150,000 Tons Capacity

Plans for South Africa's new State-owned steel plant were outlined by the new corporation's chairman on the eve of his departure for Europe to look into the matter of steel production and select the technical expert who will guide the destiny of the venture, according to the Department of Commerce.

Initial production of 150,000 tons per annum will be aimed at, according to his statement, the department is informed by Trade Commissioner Samuel H. Day, Johannesburg. Importations of raw steel are at present about 300,000 tons. Manufactured steel products made by new subsidiary industries are expected to take another 150,000 tons of raw steel. The value of steel imported into South Africa in 1927 was £2,500,000, and in 1926, £3,000,000.

Thus, if the corporation obtained the whole Union market and had the benefit of the demand of subsidiary industries for products that could easily be made in South Africa, the total eventual production might be as high as 500,000 tons per year, it is said.

Emphasis was placed on the new company's policy to treat all suppliers, whether British, German or American, on a fair and equal basis in calling for tenders for plant equipment. No contracts were to be placed during the coming European trip, since these were to come only after prolonged study and arrival at final details by the staff of experts.

Booklet on International Foundrymen's Congress

A 44-page illustrated booklet has been issued giving the details of the arrangements for the Third International Foundrymen's congress to be held in London, England, June 11 to 15, 1929. It contains full information regarding the various tours and other arrangements that have been made for the convenience of American foundrymen who expect to attend. The booklet, prepared under the supervision of the committee on international relations of the American Foundrymen's Association, is being distributed by the association and by the official travel agents, Thomas Cook & Son, 585 Fifth Avenue, New York.

A general description of the Third International Foundrymen's congress follows a foreword by S. T. Johnston, president A. F. A. Subsequent sections describe the arrangements that have been made for plant visitation, sightseeing, and the official tours. The latter section, which is very complete, includes detailed itineraries and quotes rates of fare covering the trip to the London congress itself, the official pre-convention tour of Great Britain, and a choice of three post-convention tours covering attractive sections of the continent of Europe.

An American foundryman may attend the Third International Foundrymen's congress for as little as $391 from New York, including round trip cabin steamship accommodations, hotel rooms in London, breakfasts while ashore, local sightseeing, entertainment, etc. The most elaborate tour listed covers most of England and Scotland, Belgium, Germany, Switzerland, Italy and France.

The booklet is illustrated with reproduction of events at the First International Foundrymen's congress in Paris in 1923 and typical European scenes. Copies may be obtained from the official travel agents, or C. E. Hoyt, executive secretary American Foundrymen's Association, 222 West Adams Street, Chicago.

Study of Metallurgical Problems at Pittsburgh

The current year's program of the metallurgical advisory board of the Carnegie Institute of Technology and the United States Bureau of Mines on which five research fellows, one research engineer and an assistant and an analyst now are at work under the instruction of a group of men from the Pittsburgh station, United States Bureau of Mines, embraces the following problems:

Physical chemistry of steel-making (plant work), by C. F. Christopher, research engineer, University of Pittsburgh, metallurgical engineer, who will have A. D. Myer as assistant and J. F. Sanderson as analyst in the work.

A study of the cause and control of abnormality in case-carburized steel by J. E. Jacobs, Carnegie Institute of Technology, metallurgical engineer, class of 1928.

Formation and identification of inclusions by M. F. Judkins, University of Washington, chemical engineer, class of 1928.

Distribution ratio of iron oxides between slag and metal by W. O. Krebs, Yale University, chemical and metallurgical engineer, class of 1928.

Method of determining inclusions by W. E. Marshall, Georgia School of Technology, chemical engineer, class of 1927.

Viscosity of open-hearth slags by Kenneth Metcalfe, Rose Polytechnic Institute, chemical engineer, class of 1928.

The Bureau of Mines instructors in charge of Dr. C. H. Herty, Jr., are: J. M. Gaines, Jr., B. M. Larsen, G. R. Fitterer, H. Freeman and P. W. Edeburn.

Montclair, N. J., Adopts Institute's Specifications

The standard fireproofing specifications, as drafted by the American Institute of Steel Construction, have been adopted by the city of Montclair, N. J. This is the first city in the United States to take such action. The ordinance adopted by Montclair as an amendment to its building code reads:

"The fireproofing of structural steel shall conform to the standard specifications for fireproofing structural buildings of the American Institute of Steel Construction, dated Oct. 8, 1927."

The Florida Building Officials' Conference unanimously adopted on Nov. 17 a uniform building code which includes in its entirety the institute's standard specification for structural steel for buildings. This building code was immediately accepted by the city of West Palm Beach and will be adopted by all of the larger cities of Florida by ordinance, as the Building Officials' Conference has no mandatory powers. The State of Florida purposes to have legislation enacted ultimately making the use of the new code compulsory throughout the State.

Fabricated Structural Steel

Awards of 42,400 Tons Include Several Large Jobs—Chicago Office Building Will Take 10,000 Tons

AWARDS during the last week totaled 42,400 tons. Of outstanding size were 8600 tons of plates and shapes for a ship to be built at Chester, Pa.; 7200 tons for an insurance building at Hartford, Conn.; 5600 tons of shapes and sheet steel piling for a railroad warehouse at Jersey City, and 5000 tons for an office building at Boston. New projects, calling for 27,400 tons, included 10,000 tons for an office building at Chicago. Awards follow:

BOSTON, 5000 tons, United Shoe Machinery building, to New England Structural Co.

BOSTON & MAINE RAILROAD, 1400 tons, 12 bridges, to Boston Bridge Works, Inc.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, 250 tons, freight shed, to Palmer Steel Co.

HARTFORD, CONN., 7200 tons, building for Etna Life Insurance Co., to Levering & Garrigues Co.

WHITE PLAINS, N. Y., 365 tons, Peoples National Bank Building, to Hay Foundry & Iron Works.

NEW YORK, 2200 tons, office building at Madison Avenue and Forty-seventh Street, to Levering & Garrigues Co.

NEW YORK, 785 tons, apartment building at 423 East Eighty-sixth Street, to Paterson Bridge Co.

NEW YORK, 520 tons, apartment building at 237 East Twentieth Street, to A. E. Norton, Inc.

NEW CITY, N. Y., 900 tons, Rockland County Hospital buildings, to unnamed fabricator.

ASBURY PARK, N. J., 1500 tons, convention hall, to Hedden Iron Construction Co.

JERSEY CITY, 5600 tons, 1600 tons in column cores for Delaware, Lackawanna & Western terminal, to Levering & Garrigues Co., and 4000 tons of sheet steel piling, to Bethlehem Steel Co.

CHESTER, PA., 1600 tons of shapes and 7000 tons of plates for ship to be built by Sun Shipbuilding Co., to Carnegie Steel Co.

PITTSBURGH, 400 tons, apartment building, to McClintic-Marshall Co.

CLEVELAND, 700 tons, plant for Geometric Stamping Co., to Austin Co.

FLINT, MICH., 900 tons, Flint Auditorium, to Flint Structural Steel Co.

PONTIAC, MICH., 100 tons, truck repair building for Fisher Body Corporation, to R. C. Mahon Structural Steel Co.

STATE OF INDIANA, 600 tons, highway bridges, to Rochester Bridge Co.

CHICAGO, 345 tons, store and loft building, to Duffin Iron Works.

CHICAGO, 150 tons, warehouse for John Sexton & Co., to Wendnagel & Co., local.

GREEN LAKE, WIS., 375 tons, club house, to Vulcan Mfg. Co., Fond du Lac, Wis.

MONTICELLO, MINN., 800 tons, bridge, to Minneapolis Steel & Machinery Co.

KANSAS CITY, MO., 425 tons, Klein Building, to Kansas City Structural Steel Co.

PARADISE, MONT., 570 tons, Clarks Fork bridge, to unnamed interest.

LA HABRA, CAL., 100 tons plates, riveted pipe line, La Habra Heights subdivision, to Western Pipe & Steel Co.

SAN FRANCISCO, 2870 tons, Methodist Book Concern hotel, McAllister and Leavenworth Streets, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 480 tons, store and office building on Newbury Street.

BOSTON, 110 tons, Boston Elevated Railway garage.

PORTLAND, ME., 500 tons, Maine General Hospital.

NEW YORK, 1000 tons, apartment building at 37 West Seventy-second Street; James Stewart & Co., Inc., general contractor.

NEW YORK, 700 tons, apartment building at 4 East Seventy-second Street; George A. Fuller Co., general contractor.

NEW YORK, 200 tons, building at Broadway and Sixth Avenue for John David store.

STATE OF NEW YORK, 150 tons, highway bridge.

STANDARD OIL CO. OF NEW JERSEY, 1000 tons, five tanks.

PHILADELPHIA, 500 tons, office building at Sixty-ninth and Market Streets.

BALTIMORE, 100 tons, building for Stone & Webster, Inc.

ERIE, PA., 2000 tons, building for Erie Dry Goods Co.

LOUISVILLE, 1600 tons, approaches to highway bridge spanning Ohio River.

CINCINNATI, 140 tons, municipal garage.

CINCINNATI, 2000 tons, building for Union Gas & Electric Co.; George A. Fuller Co., general contractor.

CLEVELAND, 600 tons, Robert Fulton and Louis Agassiz schools.

YOUNGSTOWN, tonnage unstated, seventeen-story building for Central Trust & Saving Co.

FLINT, MICH., 1500 tons, Union Trust Co. building.

DETROIT, 800 tons, section 5, Detroit-Windsor tunnel, including Customs building and Detroit approach.

DETROIT, tonnage unstated, *Detroit Times* building.

CHICAGO, 10,000 tons, office building at 1 North La Salle Street.

CHICAGO, 1000 tons, First Regiment Armory; Mississippi Valley Structural Steel Co., low bidder.

MINNEAPOLIS, 1400 tons, Northwestern National Bank building.

PRAIRIE DU CHIEN, WIS., 1300 tons, highway bridge.

BARABOO, WIS., 280 tons, Federal aid bridge across Wisconsin River at Delton; general contract awarded to Fischer & Yahr, Wausau, Wis.

New Steel Putty Drums

The Geuder, Paeschke & Frey Co., Milwaukee, has added 50-lb. and 100-lb. putty drums to its line of Wedg-Seal containers. These drums have the Wedg-Seal patented inclosure designed to keep the oil from leaking out and are constructed to withstand handling and shipping abuse. It is claimed that this permanent tight seal is necessary to keep the putty in perfect condition, and after opening it can be resealed securely, eliminating the need for adding oil.

Steel Water Tank and Lookout Platform

WENTZ CAMP, 4 miles northeast of Ponca City, Okla., is a boy scout camp of 160 acres on which barracks have been erected and improvements made to accommodate 1000 boys. One of the first things the visitor sees is the combined water tank and lookout, shaped something like a giant scepter.

The spherical portion, 21 ft. in diameter, holds 30,000 gal. of water, which is used as a general supply. The tower or cylindrical portion, 7 ft. in diameter and 75 ft. high, incloses a circular stairway which extends through the tank to a platform 10½ ft. in diameter. This observation point, 94 ft. above the ground, is surrounded by a lattice fence and equipped with a telescope and searchlights.

Steel plates used in building this structure range from 5/16-in. to ⅝-in. thick. They were fabricated at the western plant of the Chicago Bridge & Iron Works and erected by one of that company's field crews. A swimming pool and additional buildings are under construction.

This Issue in Brief

Cuts costs and improves quality of work by freeing machine operators from "common labor" work of lifting and carrying. Truck builder finds it pays to install short gravity conveyors to carry heavy parts from machine to machine.—Page 1426.

* * *

Arc welding induces large "negative" or compressive stresses in steel plate adjacent to the weld, investigator finds. These deformations persist even after the welded bead is milled off.—Page 1429.

* * *

Impartial and rigid inspection of manufactured parts is insured by having inspectors report directly to engineering department. In this way sympathetic connection between production department and inspectors is avoided.—Page 1419.

* * *

Dead stock is kept out of stockroom by selling material unused in six months. "Corpses" are cleared by systematic sale of dead items. Purchasing agent is made responsible for sale of materials no longer used.—Page 1421.

* * *

Instead of buying more core ovens, foundry substituted gas fuel for coke. The change increased output to such an extent that existing equipment yielded increased product.—Page 1424.

* * *

Accident hazard not increased by greater mechanization. By placing employees' safety first when laying out or purchasing new equipment, iron mines have been able to keep down accident rate, despite considerable increase in mechanical equipment.—Page 1431.

* * *

Forty-three million dollars' worth of American machinery was shipped abroad in October. This is a gain of 32 per cent over September. Machinery exports for first 10 months are 13 per cent above same period of 1927.—Page 1480.

Takes the "guess" out of manufacturing for stock by budgeting production according to surprisingly accurate sales forecast index. Valve and fittings manufacturer found that his sales curve fluctuated almost exactly in parallel with composite curve based on operations in industries in which his product is used. Now he can tell ahead whether to cut production or to prepare for increased orders.—Page 1431.

* * *

Structural fabricator gages bar lengths quickly by placing the bar to be cut in a long channel, in which holes are cut at 3-in. intervals. Foot marks are stencilled on the channel. The holes accommodate a gage block, permitting accurate measurement to be made almost instantly.—Page 1434.

* * *

Storm of protest raised by proposed mileage freight rates on iron and steel. Consumers, producers, railroads, Chambers of Commerce and others file protests before Commerce Commission. Producers say rates would be unreasonably high. They deny that rates should be on a uniform mileage level, and furthermore claim that the scale is unscientifically drawn.—Page 1442.

* * *

Prophesies steadily increasing foreign trade. Dr. Klein foresees steadily increasing export business for American manufacturers. World buying power is growing, he says, and will grow as long as peace prevails.—Page 1478.

* * *

Lowers production costs by means of simplified stock control. Simple system enables cash register manufacturer to keep track of 52,000 parts, using only 28 different forms. Elaborate records, with accompanying costly clerical force, are eliminated.—Page 1420.

Manufacturing heads must know something about markets, and sales executives must know something about manufacturing, if the business is to prosper to the utmost. The old, neatly drawn divisions are too narrow for modern industrial executives, for manufacture in many lines is in a state of flux, calling for men who can see and comprehend the business as a whole—not just one part of it.—Page 1448.

* * *

Reduces money tied up in stock. As motor trucks are now built to specification, Cleveland plant no longer makes stock models, but keeps stock liquid by maintaining it in the form of finished machine parts, sub-assemblies and partial assemblies. Final assembly is made to meet the specifications of the customer.—Page 1425.

* * *

Work goes through the plant in the same tote box. Material in process in the N. C. R. plant goes from operation to operation in the same box. Accompanying the box is a stock card on which each department foreman marks the quantity of parts processed, the check number of the operator, and the date work was finished.—Page 1423.

* * *

Pig iron output establishes new post-war November record. Daily rate of 110,084 gross tons attained last month is highest November rate since 1918. Gain over October was 1.15 per cent. On Dec. 1 there were 194 furnaces in blast, a loss of 3 during the month.—Page 1452.

* * *

No bewhiskered cost figures here. Cost records are never more than 5 hr. behind the actual work. As soon as work on a certain order is completed, department clerk in cash register plant sends labor ticket to stock ordering department. In this way, not only are cost figures kept up to date, but duplicate payment to workmen is prevented and the location of the work is always known.—Page 1423.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Higher Convention Standards

ONE who attended the recent convention of the National Founders' Association in New York could not but realize, if he had had similar contact with the association in its earlier years, that the old order has changed, in fact, has been revolutionized. Those conventions of the early nineteen hundreds rang with high-pitched notes of labor conflict. Hours were given to reports from all parts of the country telling of strikes by the molders' union to enforce demands for higher wages or, as in many cases, for shop control with regulation of output, high minimum wage, limitation of employment of handy men on molding machines, and all the rest of the union program in opposition to the open shop. The whole atmosphere of the annual gatherings was charged with militancy.

Partly because the open shop has steadily made headway in the foundry trade, partly because the molders' union has somewhat modified its old views in respect to modern production methods, but chiefly, perhaps, because high wages have come to stay in all industry—at all events the latter-day conventions of the National Founders' Association have lost the old note of militancy. The same is true of the like gatherings of the National Metal Trades Association.

Instead of recounting their engagements with the embattled hosts of unionism, the founders and the men of the metal trades make their annual meetings more like Chautauquas in economics, Government relations to industry, production management, cost accounting, modern marketing, and all the movements that have been remaking industries in the decade since the great war. With manufacture in many lines in a state of flux, executives in the metal-working industries are turning these meeting places into centers of education and of constructive effort. They recognize that leaders in industry today must know much more and about many more things than their predecessors needed to know 20 or 25 years ago. They are finding out also that once orthodox ideas of departmentizing their businesses are much too narrow for this day. Operating men now know that they must study markets and the developments in trade if they are to sit intelligently in conference with managers of sales. And sales executives equally appreciate that the old-time go-getter salesman is being succeeded by a type whose equipment includes much that was once left exclusively to the man in the shop. Thus convention programs take a wide range and appeal to all classes of executives.

What is happening in the association work of the foundry and metal-working industries is seen in manufacturers' organizations in all lines. The changed conditions of post-Armistice years call for bigger and broader men as heads of industry, and the higher plane of the association convention of today is a distinct response to the new demand.

Is There a New Inflation?

IN a recent address before the Harvard Economic Society Colonel Ayres predicted that high industrial and commercial activity will continue into at least the early months of 1929, but expressed the opinion that this country is now experiencing an inflation; an inflation after $500,000,000 of our gold (about one-ninth of our total stock) has gone abroad—which would be a new kind of inflation; and he declared that there are vague but real dangers in the increase of loans to brokers by corporations and individuals.

This opinion affords grounds for serious consideration, although exception may be taken to certain of the fundamental statements. Especially is it doubtful if our industrial and commercial activity be at so high a rate as is generally supposed. Many indices support the common belief, but none of our many composite indices of production is satisfactory, and we are lacking any such thing as a general economic index that is any more than a guess. It may be that we are experiencing dazzling activity in some branches of industry and backwardness in others.

There are perplexities in the existing economic situation in this country for which no good explanations are offered; and in the absence of such there are bound to be vague apprehensions.

It is a common belief, entertained by so competent a financier as Secretary Mellon, that our national income has attained the figure of about 90 billion dollars. This implies a remarkably rapid annual increase during the last few years. Income tax returns go some way toward supporting such a belief.

On the contrary, Dr. W. R. Ingalls, who makes an annual estimate that is published in the *Annalist*, reckons the internal national income in 1927 at 73 billion dollars, compared with 74.9 in 1926 and 73.5 in 1925. Doctor Ingalls makes this estimate according to a consistent formula. He also offers an accounting of the industrial income, according to statistics actually reported, into which enter none of the factors that play a part in the formula. The industrial accounting, in millions of dollars, is as follows:

	1925	1926	1927
Agriculture	13,034	12,985	*13,000
Mineral	5,678	6,213	5,520
Building (50 per cent)	3,300	3,480	3,470
Steam railroad	6,123	6,383	6,139
Public utility	1,827	1,995	2,113
Telephone	793	878	950
Manufacture	26,800	*28,000	*27,000
Total	57,555	59,934	58,192

The figures indicated by asterisks are more or less

conjectural, which is not, however, to imply that they are reckless guesses. The industrial accounting foots up to about 80 per cent of the total estimated by formula. Both methods give totals of a similar character, i. e., showing but small additions from year to year. This immediately raises two questions: how to account for the difference between 75 billion dollars and 90 billion, and how to account for great increases from year to year.

Some explanation may be found in the stock market. At the middle of 1926 the quotational value of all the stocks listed on the New York Stock Exchange was about 35 billion dollars. At the beginning of November, 1928, it was 61 billion, against which 5.9 billion was being borrowed. All of this great appreciation in nominal value has not been converted into income, either by way of dividends or liquidated profits, but some of it has. Thus the total of State income tax revenue in Massachusetts in 1927 was upward of 21 million dollars, which was about 5 million dollars more than normally, all of which gain is directly traceable to transactions in stocks.

Increases in national income in that way, therefore, may swell and distort the income reckoned as derived from industry, i. e., agriculture, mining, manufacturing, transportation, etc. But all income must be spent, either by the direct recipient or by some one else, unless it be converted into gold to be hoarded. The last certainly has not happened, for we have exported gold. Consequently, if it were really spent, it ought to be used in producing more goods. But irrespective of the exhibitions of single industries, or even groups of industries, our aggregate statistics do not reveal any such thing in any particularly noteworthy way.

A distinct and much discussed feature of the present situation is the great volume of loans on securities that are being made by others than bankers. This means that corporations instead of distributing their surplus among their stockholders, to be spent by them, and instead of themselves spending it for increased production (which they may deem to be temporarily unwise) are lending it to speculators and thus contributing toward the bidding up of security quotations. We have herein a good deal of a paper, or credit, situation, which is different from the physical and material; and presents good ground for apprehension that a reversal of the whole process will extinguish a good deal of fiction or inflation. If, when and as the bubble is punctured there will be losses instead of gains to be figured in income tax returns. Such a puncturing may occur through the withdrawal of corporate credit from the stock market and its use in the production of more goods.

We may draw a distinction, therefore, between goods income and goods plus credit income and this may explain in part the discrepancy between estimates of 75 and 90 billion dollars. It is conceivable that estimates on the former basis may increase while on the latter they are receding; but if so there might be more or less of discomfort in the process.

The retention of great surpluses by corporations looks economically dangerous and to be largely contributory to and explanatory of the existing situation. Let it be observed that, while the total loans on New York Stock Exchange collateral are only about 9 per cent of the total quotational value, probably the major portion of the latter is owned outright and the loans are in a much greater proportion to the floating supply that changes hands. The corporate surpluses result no doubt from the inability of the corporations to use them in their own businesses, which are already overbuilt in general. If they were distributed to stockholders, the buying ability of the latter would be increased, which would be reflected in increased demands for goods; and excessive producing capacity would be more rapidly brought into use and some of the present paradoxes would disappear.

A Study of Wage Rates

UNCLE SAM finds the same difficulties in personnel management that confront any other large employer. Many of them resolve into the question of wages and salary. "What is the ruling rate for file clerk, for dictaphone operator, for messenger, for truck driver?" are questions which must be answered by anyone who attempts to pay a fair wage for standardized duties. The fair rate is doubtless affected by variable cost of living in different regions and by steady employment or safe tenure. But in any case some comprehensive information is necessary before Congress can act fairly on the prayers for salary adjustments being made by various groups of civil service employees.

For this very purpose the national Government's Personnel Classification Board is undertaking a comprehensive survey of current labor rates, both by field investigators and by questionnaires. As is the usual procedure, the individual returns will be confidential; the tabulated summaries, however, will be published not only for the benefit of Congress and other officials, but for every personnel manager in the country. It is therefore a matter of self interest for those organizations among the metal trades which are approached to procure and forward the desired information promptly. The successful termination of the investigation should not only benefit the great army of government employees, but be of value to economists, labor departments and progressive business executives generally.

The Quest for Business Stability

FOLLOWING a succession of years in which price variations have been narrow, the value of stable markets has won wide appreciation. Profits are being made not so much by luck or foresight as by increased industrial efficiency. Economies have been found in steady plant operations. To make production still more stable, all obstructions to the even flow of business are objects of attack. Organized efforts are being made to free industry from the unsettling and demoralizing effects of unfair competition. Methods of distribution are being studied to find new ways to reduce the cost of getting goods from plant to consumer.

In this connection cross-hauling of steel has been condemned as uneconomic. Yet, curiously enough, certain steel producers deliberately cultivate trade outside their natural markets to achieve the very stability that cross-hauling is said to disturb. On the theory that it is unwise to put all of the eggs in one basket, these companies aim to free themselves from the full effects of a possible local depression by having customers in other districts.

Along with the study of distributing methods, mar-

ket research is receiving more attention. By careful surveys some manufacturers have succeeded in forecasting their bookings so accurately that great economies in production have been made possible. Finding out what the consumer is likely to buy has become one of the most fascinating of business problems.

In lines of manufacture where style is a factor, calculations of probable consumer demand are always contingent on a certain element of chance. It is well known that eye appeal now is a primary factor in determining the success or failure of automobile models.

Fortunately for iron and steel and machinery no uncertainties of style directly disturb stability. Economical output is virtually assured so long as sufficient demand can be found. To obtain this sine qua non, market research is valuable not only to forecast business but to develop new uses for products. The machine tool salesman has long been on the lookout for new applications for existing equipment and for opportunities to develop machines to fit new requirements. Some steel companies compile records of the tonnage needs of all consumers in their territories; others have profited by a more penetrating study. Knowing the customer's business is becoming not merely a desirable, but a necessary, part of the sales campaign.

Big or Little Business?

PERHAPS it is chiefly the item of brains that determines whether a given business enterprise will succeed better by being big or by being little. There has been a good bit of propaganda about big business, some of it merely by writers or speakers who saw a chance to show off by taking the side that was once unpopular. Yet we still hear a good deal of sound talk about cases in which little business is likely to get along better than big business.

For an illustration we have coal mining. For many years there has been altogether too much productive capacity. One might suppose that by this time a substantial proportion of the small mines would have been eliminated. The statistics show that this is not the case, and when the matter is submitted to men well versed in coal mining matters the rejoinder is: "Of course not. Bare production costs are about the same and the big concerns have much more overhead." Coal mining, if not relatively simple, is a thing on which one readily can secure all the requisite information, there being experts available and ample means for picking out the best equipment. The individual company does not need to possess much ingenuity or initiative.

Steel making might be supposed to be different, but one often hears in the steel trade intelligent references to cases in which the small steel mill will do the better, in highly specialized products. The small strip mills of Germany are mentioned in this connection. They measure their success by revenue rather than by tonnage. When, with a much smaller increase than formerly in the total tonnage, steel has been growing more and more diversified in character and has been passing into innumerable small uses, may we not reasonably infer that conditions are really growing more favorable for the small units? There was a time when costs were being reduced rapidly by mere bigness, but the bigness has gone so far, involving such heavy capital outlays, that it demands tonnage, and when there is not tonnage it is at a corresponding disadvantage.

If bigness necessarily gives low final cost, and if erection of dwelling houses and other small structures is inefficient, how does it come that by this time we do not have one or more big companies operating throughout the country and putting up these buildings by the thousands? Following the theories accepted in so many quarters it could be demonstrated that here is a great field. The big company could have a much wider variety of plans, all tested and safe, for the customer to select from than is available when as now the prospect consults the individual architect. Yet the thing has not been done, and there must be a reason. Overhead may be one reason; the disposition of the average man to patronize an individual, who may be more sympathetic if not so intelligent, may be another.

If a great deal of research is necessary to make the best product, and if the means cannot readily be imitated, there is a reason for big business in such cases; but when it comes to secrecy the little business seems to have the advantage. To a considerable extent, it appears to be a question of whether or not a great deal of brains is required.

Right before us we now have argument and contest on this score in another branch of business, that of retail merchandising. The chain stores have been succeeding, but it is argued that if the individual storekeeper should use the same skill, not difficult to acquire, he will be able to hold his own in spite of the combinations' advantage in mass buying. If he does not, the case will not necessarily be proved, for many storekeepers do not display merely an average amount of ability.

What Makes a Good Joint?

AT the recent meeting of the International Acetylene Association, a manufacturer of refrigerating equipment stated that in the last five years not a single leaky weld had left his shop. A steam heating contractor also testified that no leaks had been reported in his welded installations in an equal length of time, nor could he imagine the circumstances which would induce one of his workmen to make a defective joint. A past president of the American Welding Society and a pioneer in the industry has stated publicly on many occasions that he has never heard of a failure in a weld made under procedure control. An executive of a company which has arc-welded hundreds of stills for petroleum refineries said that not one had proved defective at the joints, despite continued use at high temperature and pressure.

Over against this remarkable testimony must be placed the exhibit at a Government bureau, containing dozens of electric and gas "welds" which failed in service. We must consider the well-nigh universal feeling among the older engineers that the "weld is no better than the welder," and that even the best workman has his blue Mondays. Lastly, many have had unsatisfactory experiences with the repair man who attempted to fix a broken lawn mower, a gas engine block, or a piece of household equipment.

The reason for this contradictory situation is that the first four men referred to joints made under pro-

cedure control—that is, joints made with due consideration for the quality of the metal being welded, the design of the article, the welder's skill and equipment, his supervision, and the final inspection and test. All of these essentials are the result of good management. With them the result is satisfactory—would be satisfactory, indeed, no matter what the operation might be.

Riveting requires the same elements of procedure control. As the president of the Welding society (who is closely connected with a leading steel fabricator) has pointed out, engineers and the public generally accept riveting not because an inspector has tapped each rivet head, but because long experience has shown that riveting in the hands of an honest organization makes dependable joints.

Only a similar experience with competitive processes will yield a similar confidence, and eventually prove the soundness of welded joints. The customers of the first four gentlemen quoted are part of this growing body of opinion.

BEWILDERMENT over the spectacular jumps which every day's stock market records has extended even to men described as "among Wall Street's shrewdest operators." One such observed the other day that without doubt we are going through a process of inflation, adding with due circumspection: "I still cling to the belief that one and one make two." Such an expression might classify its author as of an outgrown era, but it is about the only type of judgment that may safely be passed upon the amazing developments of these six-million-share days. As the wonder grows, the question keeps recurring whether the minds that seemingly control the situation have grasped something which others have missed, though equally intent on knowing all that is to be known. Or is it the Florida boom over again on a more stupendous scale and with no less certain a reckoning ahead, even though the credit supply suffice for further increases in brokers' loans and the reaction when it does come be without a sudden smash?

Should Furnaces Run on Sunday?

(*Concluded from page* 1432)

fine. But we never could get a bed of iron until Monday evening; after that, we let out a bed every morning and evening. I noticed, however, that we did not make as much iron in the fore part of the week—say the three first days—as the three last. This undoubtedly was owing to the ore being reduced on Saturday, so as to have the furnace in good order for stopping. This was done to prevent the furnace from cooling off as fast as it would have done had the burthen or ore all been left on. In this case we no doubt would have had a great deal of trouble in starting, and perhaps not have been able to get the furnace cleared at all; for in all my experience with furnaces it was running a considerable risk to stop any length of time with a full burthen. I feel satisfied, had we not stopped on Sundays, the furnace would have made 4 tons of metal with the same hands and nearly the same amount of stock, instead of about 3 per day.

The next year, say '48, the furnace did not do so well. This I thought was owing entirely to the ore, as it had to be got farther in the hill, and underwent a change for the worse. It was much harder to smelt and did not yield as it had done. We tried stopping several Sundays in '48, but found that it did not do anything like so well as when we stopped in the summer of '47. I am therefore clearly of the opinion that it depends upon a great many circumstances, as to the practicability of stopping furnaces over the Sabbath.

Your Brother,

SAMUEL DUNCAN.

How Procedure Control Welding Originated

(*Concluded from page* 1434)

ments. It was obvious that this program would require a careful analysis of all of the features involved, including the training and supervision of the welding operators, the selection of material to be welded and the welding rod used, the design of the joint for welding, the proper preparation of the parts for welding, the proper technic for actually making the welded joint, and adequate provision for testing the finished job.

Men in the petroleum industry had an adequate appreciation of these essentials; consequently in 1924 members of the engineering and service staff of the Linde Air Products Co. were asked to cooperate in the laying of a long overland pipe line in eastern Texas. Welding crews for this line were organized and trained and the line put in in record-breaking time. Out of the 60,000 or more welded joints required to lay 220 miles of 16, 18 and 20-in. pipe in 20-ft. lengths, only four or five proved defective under test and these were promptly rewelded.

At the completion of this job all our men who were in contact with it pooled their experiences and out of this fund of information came a schedule of practices covering the six steps previously mentioned. This outline of good practice for pipe laying seemed to furnish a set of specifications whereby similar work could be done on other lines, and were designated a "procedure control" for pipe line welding. This procedure control was used and proved highly successful on other installations of similar character, now totaling several thousand miles.

It was obvious from the first that the principles of procedure control could be applied to other applications of welding—in fact, that they are a set of basic principles upon which any welding application might be conducted. And in practice over several years this has proved correct. Procedure control welding has been applied with outstanding success to the production of pressure vessels, light sheet metal products, the reclamation of steel and gray iron castings, bronze-welding of cast iron pipe, and many other major applications of the oxy-acetylene process.

Procedure control for oxwelding considers the following essentials:

A. Determining the ability and knowledge of the welding operators.
B. Selection of material to be welded.
C. Design of the joint for welding.
D. Proper preparation of the parts
E. Welding technic.
F. Testing of the welded product.

When these elements are properly provided for, the oxy-acetylene process can be depended upon to furnish a dependable and safe construction for practically any type of metal structure. By understanding and applying these fundamentals the outstanding advantages in flexibility, quality and cost of the oxy-acetylene process for joining metal sections can be obtained. This procedure control idea, while representing an outstanding development in the managerial aspects of welding, is not new, but is simply the application of accepted good practice for engineering design and construction to work done by the oxy-acetylene process.

Iron Output Increased in November

Daily Rate Gained 1252 Tons or 1.15 Per Cent Over October—Largest November Since 1918—Net Loss of Three Furnaces

PIG iron production in November, according to actual returns received from all companies, showed an increase of a little over 1 per cent over October. It was also the largest for this year and exceeded all records for that month since November, 1918.

Total November pig iron output was 3,302,523 gross tons, or 110,084 tons per day for the 30 days, as against 3,373,506 tons, or 108,832 tons per day, for the 31 days in October. This is an increase for November of 1252 tons per day, or 1.15 per cent. In October the increase over September was 6755 tons per day, or 6.6 per cent. The November rate was the largest this year and compares with 88,279 tons per day in November last year. It was also the largest in 19 months, or since April, 1927, when the daily rate was 114,074 tons. The rate last month was also the largest for November since 1918, when the daily rate was 111,802 tons. There have been but two November daily rates exceeding that of this year—in 1918 and in 1916. In 1916 the rate was 110,394 tons per day.

Operating Rate Active on Dec. 1

There were 194 furnaces active on Dec. 1, having an estimated operating rate of 108,575 tons per day. This compares with 108,800 tons per day as the operating rate for the 197 furnaces active on Nov. 1. Last month three furnaces were blown in and six were shut down. Several large furnaces were operated at a high rate in November, which accounts in part for the high operating rate of the 194 furnaces on Dec. 1 as compared with the 197 on Nov. 1.

Of the three furnaces blown in during November, one was a Steel Corporation stack, one belonged to an independent steel company and one was a merchant stack. The six furnaces shut down included three Steel Corporation stacks, two inde-

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1924—Gross Tons

	1924	1925	1926	1927	1928
Jan.	97,384	108,720	106,974	100,123	92,573
Feb.	106,026	114,791	104,408	105,024	100,004
Mar.	111,809	114,975	111,032	112,366	103,215
Apr.	107,781	108,632	115,004	114,074	106,183
May	84,358	94,542	112,304	109,385	105,931
June	67,541	89,115	107,844	102,988	102,733
½ year	95,794	105,039	109,660	107,351	101,763
July	57,577	85,936	103,978	95,199	99,091
Aug.	60,875	87,241	103,241	95,073	101,180
Sept.	68,442	90,873	104,543	92,498	102,077
Oct.	79,907	97,528	107,553	89,810	108,832
Nov.	83,656	100,767	107,890	88,279	110,084
Dec.	95,539	104,853	99,712	86,960	.....
Year	85,075	99,735	107.043	99,266	.....

Pig Iron Production by Districts, Gross Tons

	November (30 days)	October (31 days)	September (30 days)	August (31 days)
New York and Mass.	208,651	213,614	183,557	188,399
Lehigh Valley	100,423	96,912	78,272	72,648
Schuylkill Valley	60,185	53,364	51,116	52,231
Lower Susq. and Lebanon Valleys	31,106	31,084	30,680	33,153
Pittsburgh district	747,080	741,363	622,023	628,471
Shenango Valley	99,432	101,787	86,136	86,691
Western Pennsylvania	144,135	146,988	138,021	138,253
Maryland, Va. and Ky.	105,444	111,543	113,108	112,555
Wheeling district	133,237	141,727	149,813	157,507
Mahoning Valley	317,439	347,118	309,512	307,547
Central and North'n Ohio	322,405	332,966	328,382	376,706
Southern Ohio	41,203	46,074	45,363	46,367
Illinois and Indiana	615,969	655,022	609,891	625,452
Mich., Minn., Mo., Wis., Colo. and Utah	138,163	125,979	112,030	113,737
Alabama	231,366	222,142	197,367	188,896
Tennessee	6,085	6,123	7,043	7,957
Total	3,302,523	3,373,806	3,062,314	3,136,570

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
November, 1927	64,600	23,679	88,279
December	64,118	22,742	86,960
January, 1928	69,520	23,053	92,573
February	78,444	21,560	100,004
March	83,489	19,726	103,215
April	85,183	21,000	106,183
May	85,576	20,355	105,931
June	81,630	21,103	102,733
July	79,513	19,578	99,091
August	82,642	18,538	101,180
September	82,590	19,487	102,077
October	88,051	20,781	108,832
November	88,474	21,610	110,084

*Includes pig iron made for the market by steel companies.

Operating Rate of Coke Furnaces in Blast

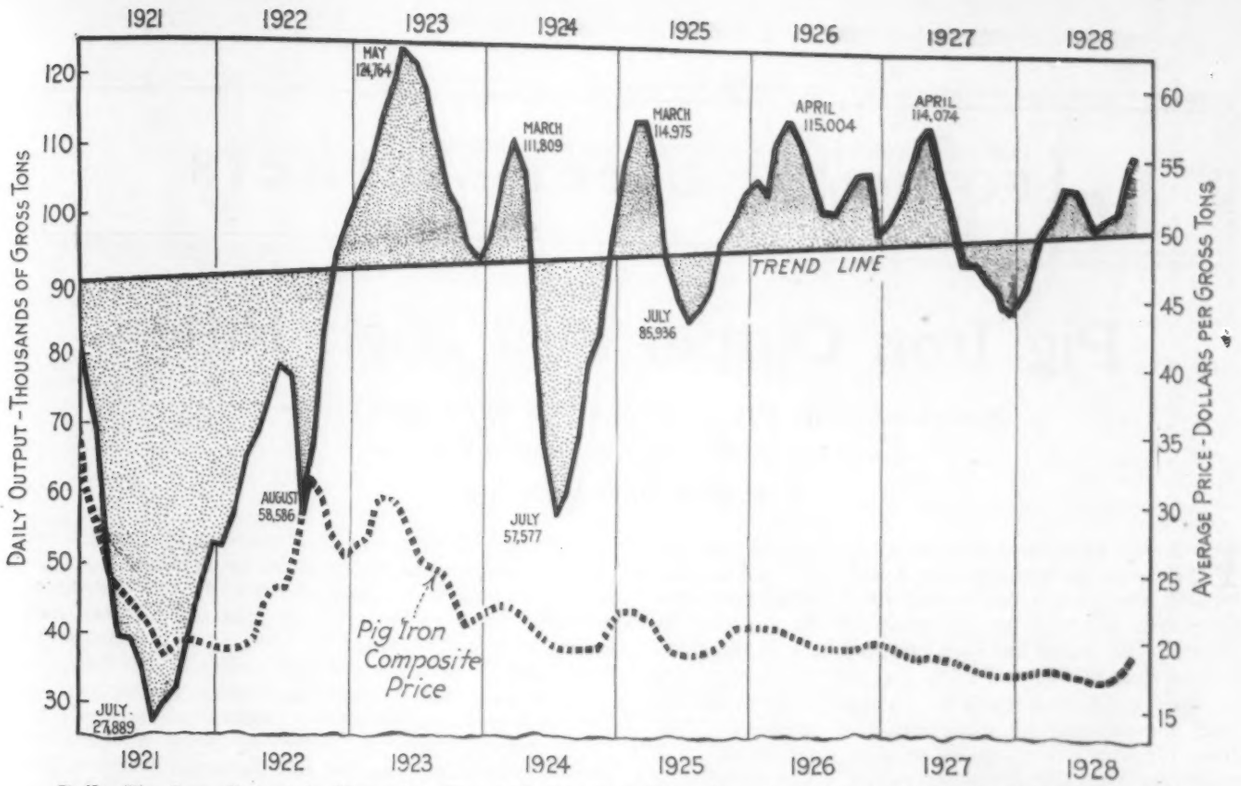
Furnaces	Dec. 1 Number in Blast	Dec. 1 Gross Tons per Day	Nov. 1 Number in Blast	Nov. 1 Gross Tons per Day
New York:				
Buffalo	11	5,850	12	5,900
Other N. Y. and Mass.	2	960	2	940
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	7	3,345*	7	3,120*
Schuylkill Valley	4	2,000	4	1,710
Susquehanna Valley	2	960	2	920
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	1	80
Pittsburgh District	36	23,000	39	24,600
Ferromanganese	2	325	2	320
Shenango Valley	6	3,300	6	3,270
Western Pennsylvania	9	4,380	9	4,340
Ferromanganese	2	415	1	210
Maryland	5	2,680	5	2,740
Wheeling District	7	4,440	7	4,570
Ohio:				
Mahoning Valley	18	11,000	18	10,750
Central and Northern	18	11,000	18	10,740
Southern	3	1,370	3	1,370
Illinois and Indiana	29	20,530	29	20,760
Mich., Wis. and Minn.	6	2,860	6	2,700
Colo., Mo. and Utah	4	1,740	4	1,650
The South:				
Virginia	0	....	0	....
Ferromanganese	1	90	1	90
Kentucky	2	745	2	760
Alabama	18	7,300	17	7,000
Ferromanganese	1	85	1	70
Tennessee	1	200	1	190
Total	194	108,575	197	108,800

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1926—Gross Tons

	1926	1927	1928
Jan.	3,316,201	3,103,820	2,869,761
Feb.	2,923,415	2,940,679	2,900,126
Mar.	3,441,986	3,483,362	3,199,674
Apr.	3,450,122	3,422,226	3,185,504
May	3,481,428	3,390,940	3,283,856
June	3,235,309	3,089,651	3,082,000
½ year	19,848,461	19,430,678	18,520,921
July	3,223,338	2,951,160	3,071,824
Aug.	3,200,479	2,947,276	3,136,570
Sept.	3,136,293	2,774,949	3,062,314
Oct.	3,334,132	2,784,112	3,373,806
Nov.	3,236,707	2,648,376	3,302,523
Dec.	3,091,060	2,695,755	.....
Year*	39,070,470	36,232,306	.....

*These totals do not include charcoal pig iron. The 1927 production of this iron was 164,569 tons.



Daily Pig Iron Output in November Was 1.15 Per Cent More Than in October; Composite Prices Increased

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 415,000 tons

pendent steel company furnaces and one merchant unit. The net loss of three furnaces for the month was in steel making stacks.

Steel and Merchant Iron

There was a gain in steel-making iron last month of 423 tons per day —the November daily rate was 88,474 tons, as compared with 88,051 tons per day in October. Merchant iron output made a larger gain last month, or 829 tons per day. The November rate was 21,610 tons per day and that in October was 20,781 tons per day.

Furnaces Blown In and Out

During November the following furnaces were blown in: One Cambria furnace of the Bethlehem Steel Co. in western Pennsylvania; one Toledo stack of Pickands, Mather & Co. in northern Ohio; and one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

The following furnaces were blown out or banked last month: One stack of the Donner Steel Co., Inc., in the Buffalo district; the Sheridan stack of the Lavino Furnace Co. in the Lebanon Valley; one Carrie and one Duquesne stack of the Carnegie Steel Co. and one Eliza furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district, and one Lorain furnace of the National Tube Co. in northern Ohio.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1926	1927	1928	1926	1927	1928
Jan.	2,599,876	2,343,881	2,155,133	29,129	31,844	22,298
Feb.	2,272,150	2,256,651	2,274,880	22,309	24,560	19,320
Mar.	2,661,092	2,675,417	2,588,158	24,064	27,834	27,912
Apr.	2,677,094	2,637,919	2,555,500	24,134	24,735	18,405
May	2,687,138	2,619,078	2,652,872	23,159	28,734	29,940
June	2,465,583	2,343,409	2,448,905	25,378	29,232	32,088
½ year	15,362,933	14,876,355	14,675,448	148,173	166,939	149,963
July	2,461,161	2,163,101	2,464,896	26,877	26,394	32,909
Aug.	2,424,687	2,213,815	2,561,904	23,557	21,279	24,583
Sept.	2,436,733	2,090,200	2,477,695	25,218	20,675	22,278
Oct.	2,578,830	2,076,722	2,729,589	28,473	17,710	23,939
Nov.	2,484,620	1,938,043	2,654,211	31,903	17,851	29,773
Dec.	2,322,180	1,987,652	.....	31,627	20,992	.....
Year	30,071,144	27,345,888	.....	315,828	291,840	.....

*Includes output of merchant furnaces.

Magnesia and Silica Crucibles Made in Induction Furnace

The production of silica and magnesia crucibles in the induction furnace has been achieved in the laboratory of the Pacific experiment station of the United States Bureau of Mines, Berkeley, Cal. The essential new parts of this work are the development of a technique for the high-frequency furnace production of silica crucibles of greater wall thickness than could be readily fabricated from commercial fused silica, and for heavy-walled magnesia crucibles of great density and mechanical strength. A description of the method employed, which produced crucibles of excellent quality in a reasonable time and with a moderate expenditure of power and materials, is given in Serial 2896, by C. N. Schuette, recently published by the bureau.

The Foote Brothers Gear & Machine Co., Chicago, is offering its common stockholders the privilege of purchasing additional stock at $20 a share, in order to finance purchase of the Lyle Culvert & Road Equipment Co., the Stockland Road Machinery Co., and the Northwestern Steel & Iron Corporation, all of Minneapolis, and the Bates Mfg. Co., Joliet, Ill.

Iron and Steel Markets

Pig Iron Output at a High Rate

November Daily Production Largest Since April, 1927— Steel Operations Steady Despite Effect of Year-End Stock Reducing

PIG iron production last month, at 110,084 tons per day, was the highest since April, 1927, and was the largest November output since 1918. With December estimated, the total for the year will be close to 38,000,000 tons, which has been exceeded only in two years since the war, 1923 and 1926.

Steel production holds to a range of 80 to 83 per cent, notwithstanding some falling off in specifications from consumers who desire to keep their stocks at a minimum over the inventory period. The automobile industry, although demanding less steel for December shipment, owing to changes in models and to stock reduction over the year end, has arranged for large shipments early in the new year.

Except for the automobile industry, most of the major consuming lines are taking practically as much steel as at any time in months, and in a few lines, notably railroads and shipbuilding, the outlook is promising for an upward swing.

Rail orders of 42,000 tons placed at Chicago included 28,000 tons for the Chicago & North Western and 10,000 tons for the Wabash, while four roads will take a total of 25,000 tons of track accessories, with 20,000 tons about to be closed. The Santa Fe inquired for 3400 freight cars, in addition to 1075 mentioned a week ago, and is also in the market for 56 passenger cars, requiring in all 70,000 tons of steel.

American shipbuilding, long quiescent, is being stimulated by the loan provisions of the Merchant Marine Act. A Chester, Pa., shipbuilder has ordered 8600 tons of plates and shapes for an ocean liner, and a Camden, N. J., yard is seeking protection on 60,000 tons of plates and 15,000 tons of shapes for six ships on which it is bidding. Bids have been taken on two large Lake cargo vessels. A Wilmington, Del., shipyard bought 1500 tons of plates for three yachts.

The construction field continues to hold attention because of the volume of pending tonnage, which was augmented in the week by 27,400 tons, of which 10,000 tons is for a Chicago office building. Awards were 42,400 tons. A sheet steel piling contract of unusual size was for 4000 tons for a railroad warehouse in Jersey City.

Specifications from the agricultural machinery industry in November were the largest on record, and the volume of shipments is undiminished.

Such loss as may occur this month in the production of some lines of finished steel will be partly offset by increasing operations of rail mills, which are about to begin rolling of recent orders, and of tin plate mills, which are up to 85 per cent of capacity operations against a recent dip to about 75 per cent.

Although first-quarter steel contracting has not yet gathered momentum, the situation as to prices of plates, shapes and bars has been clarified by the announcements of most of the producers that no advance will be made from the range of 1.90c. to 2c., Pittsburgh, prevailing on contracts and spot orders in this quarter. Chicago mills have withheld decision on forward prices for these products, but outside competitors have sold at the current quotations. With no price advance to stimulate specifications, the mid-December deadline for completing fourth-quarter contracts may not be as effective in driving in tonnage as it was in September.

Some users of sheets, desiring to delay current quarter shipments until after Jan. 1, have been told that tonnages not released for movement this month will be invoiced at the $2 advance which is in effect on first-quarter contracts.

A reduction of $5 a ton has been made on cold-drawn alloy steel bars through a change from 1c. to ¾c. per lb. in the extra over the price of hot-rolled alloy bars.

November pig iron production was 3,302,523 tons, only 70,983 tons below the total for October, which had one more day. On Dec. 1, 194 furnaces were in blast, making iron at a daily rate of 108,575 tons, against 197, on Nov. 1, operating at a daily rate of 108,800 tons. Three Steel Corporation, two independent steel company and one merchant stacks went out of blast during the month, and one Steel Corporation, one independent and one merchant furnaces went in, a net loss of three.

Pig iron sales have declined in some sections, but prices are steady. The 50c. a ton advance made a week ago by one Alabama producer may be followed by others. Eastern Pennsylvania basic and Virginia foundry iron have been marked up 50c.

Water shipments of 53,980,874 gross tons of Lake Superior ore in the season just closed were 3,000,000 tons more than in 1927 and were exceeded in only four of the past 10 years.

The Ruhr lockout has ended with recourse again to governmental arbitration, and European steel sellers are now actively seeking orders.

A sale of 5000 tons of steel ties has been made in England to a British railroad, the first contract of the kind.

THE IRON AGE composite prices are unchanged at $18.59 for pig iron, its high of the year, and at 2.362c. per lb. for finished steel. A year ago pig iron was $17.59 and finished steel 2.307c.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Dec. 4, 1928	Nov. 27, 1928	Nov. 5, 1928	Dec. 6, 1927
No. 2 foundry, Philadelphia	$21.26	$21.26	$20.76	$19.76
No. 2, Valley furnace	18.00	18.00	17.50	17.25
No. 2, Southern, Cin'ti	20.19	20.19	19.94	19.69
No. 2, Birmingham	16.50	16.50	16.25	16.00
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa	**20.25**	19.75	19.75	19.00
Basic, Valley furnace	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh	20.01	20.01	19.76	19.51
Malleable, Chicago*	20.00	20.00	20.00	18.50
Malleable, Valley	18.25	18.25	18.00	17.50
Gray forge, Pittsburgh	19.26	19.26	18.76	18.51
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	100.00
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	33.00	33.00	33.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	38.00
O.-h. billets, Phila	38.30	38.30	37.30	38.30
Wire rods, Pittsburgh	42.00	42.00	42.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb	1.90	1.90	1.90	1.80
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh	1.90	1.90	1.95	1.80
Steel bars, Chicago	2.00	2.00	2.00	1.90
Steel bars, New York	2.24	2.24	2.29	2.14
Tank plates, Pittsburgh	1.90	1.90	1.90	1.80
Tank plates, Chicago	2.00	2.00	2.00	1.90
Tank plates, New York	2.22½	2.22½	2.22½	2.14
Beams, Pittsburgh	1.90	1.90	1.90	1.80
Beams, Chicago	2.00	2.00	2.00	1.90
Beams, New York	2.19½	2.19½	2.19½	2.14
Steel hoops, Pittsburgh	2.10	2.10	2.20	2.20

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Dec. 4, 1928 Cents	Nov. 27, 1928 Cents	Nov. 5, 1928 Cents	Dec. 6, 1927 Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago dist. mill	2.85	2.85	2.85	2.90
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.70
Sheets, blue, 9 & 10, P'gh	2.00	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago dist. mill	2.10	2.10	2.10	2.15
Wire nails, Pittsburgh	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill	2.60	2.60	2.60	2.55
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.45
Barbed wire, galv., P'gh	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.25	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$17.00	$17.00	$17.50	$14.50
Heavy melting steel, Phila	*15.00*	15.50	15.50	13.50
Heavy melting steel, Ch'go	14.50	14.50	14.50	11.75
Carwheels, Chicago	14.25	14.25	14.25	13.25
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	14.50	14.50	15.50	14.25
No. 1 cast, Philadelphia	16.25	16.25	16.75	16.00
No. 1 cast, Ch'go (net ton)	15.50	15.50	15.50	14.00
No. 1 RR. wrot., Phila	15.50	15.50	15.50	15.25
No. 1 RR. wrot., Ch'go (net)	13.25	13.25	13.25	10.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.90	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	16.12½	16.12½	16.12½	14.12½
Electrolytic copper, refinery	15.75	15.75	15.75	13.75
Zinc, St. Louis	6.35	6.35	6.25	5.85
Zinc, New York	6.70	6.70	6.60	6.20
Lead, St. Louis	**6.32½**	6.22½	6.32½	6.37½
Lead, New York	**6.50**	6.35	6.50	6.55
Tin (Straits), New York	*52.50*	52.87½	49.25	59.00
Antimony (Asiatic), N. Y.	10.00	10.00	10.50	11.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Output Maintained By Active Specifying—Price Stability Gives No Incentive for First-Quarter Buying

PITTSBURGH, Dec. 4.—December opens without material change in the rate of steel ingot output in this and nearby districts, but the explanation is less in the volume of new business than in the fact that consumers still are specifying with a fair degree of freedom against old commitments. Such losses of tonnage as there have been in some steel products are pretty well counterbalanced by the swell in the production of rails and tin plate.

Consumers seemingly have few requirements beyond those that cannot be met from existing contracts; fresh purchases also reflect a desire to keep the materials item in year-end inventories at a minimum. First-quarter buying has not yet developed much momentum. Since prices of bars, plates and shapes are to be the same as those in this quarter's contracts, buyers evidently do not sense the necessity of haste.

The stipulation as a deadline date on fourth quarter contract specifications cannot be enforced under the circumstances and this is another reason for the lack of real activity.

Not a few users of sheets do not want shipments made this month in the fear that they may not be worked off before the inventory date. Mills are insisting on specifications by Dec. 10 under the threat of an advance of $2 a ton if tonnages are not released for shipment this month. The higher prices named several weeks ago still refer more to January and later shipment than to current deliveries.

Much of the first quarter strip requirements of the motor car builders remains to be placed.

Nothing yet has been said as to first-quarter wire and nail prices, but the idea will not down that producers will seek more money, but an advance of $2 a ton, as has been suggested, will not, it is believed, include woven wire fence and wire rods.

Structural steel lettings remain very small in this district and fabricators are beginning to express some fear of inability to maintain shop operations throughout the winter unless there is early betterment in business. Railroad buying apart from track supplies has not assumed proportions calculated to elate local steel makers. The oil and gas industry is providing a fair amount of tonnage, and the hope is that it will do much better in 1929 than in recent years. Prospects for tin plate are regarded as very bright because of a belief that this year's pack will prove none too large for needs. The motor car industry is less anxious for steel and probably will not again show real desire for supplies until after the national automobile shows have been concluded next month.

Inactivity characterizes the primary materials markets. If anything, pig iron is a shade easier than it has been and in scrap there is a little more anxiety on the part of dealers for orders than there is on the part of consumers to place them.

Pig Iron.—The Westinghouse Electric & Mfg. Co. has asked for prices on its requirements of foundry and Bessemer iron for the first half of

next year; no specific tonnage is mentioned. Interest in the market on the part of melters in this district is very limited otherwise, and sales for the most part are of single carloads. On such lots of foundry iron, no particular difficulty is had in obtaining $18, Valley furnace, for No. 2 grade, but the market remains untested on sizable tonnages. No big inquiries lately have developed for basic iron. Supplies of this grade have increased in the past three or four weeks and, while some producers are still quoting $18, offerings of $17.50 are uncovered. Incidentally, this is as high as any clear cut, openly competitive business has been done. That price also is well above the average of orders now on the books of merchant furnace companies. A price of $18.25 for Bessemer and malleable iron is supported entirely by small lot sales. There is some evidence that Ohio and Indiana foundries, which lately have been drawing upon Valley furnaces for supplies, have become well covered on their immediate requirements. This fact, in conjunction with the lower rate of steel ingot production and the incident change in the position of steel companies with respect to surplus iron supplies, gives the general market an easier tone. The Jones & Laughlin Steel Corporation has taken off one of its Aliquippa furnaces for relining.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.50
Bessemer	$18.25 to 18.50
Gray forge	17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.25 to 18.50
Low phos., copper free	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Semi-Finished Steel.—Billets, slabs and sheet bars reflect in specifications no material letdown in the operation of sheet, tin plate and strip mills. But new business is very dull, and active negotiations for first quarter tonnages are yet to be begun. Non-integrated sheet makers probably are waiting to see how well the advance in first quarter sheet prices goes over before entering orders for sheet bars at an advance of $1 a ton over this quarter's contract price. Strip makers appear assured of some advance over the prices they have received in the past six months, while the billet and slab prices for the first quarter are the same as in this quarter, but $1 a ton above the third quarter price. The next quarter's price on wire rods is yet to be announced, but the common belief is that it will remain at $42, base Pittsburgh or Cleveland.

Bars, Plates and Shapes.—Without the formality of public announcements, makers are empowering their salesmen to take first quarter contracts at the prices in effect on fourth quarter commitments. Business is fairly active in specifications, but suffers somewhat from the fact that consumers are desirous of having light stocks at the end of the year, and since there is to be no advance in prices for first quarter, the deadline date on this quarter's contract specifications is rather ineffective as a business stimulant. Structural lettings in this area run chiefly to small tonnages and no sizable projects are in sight. Local shops are busy, but need more orders to carry through the winter at an economical rate of operation.

Rails and Track Supplies.—Distribution of the New York Central track accessories orders is yet to be announced, but local producers expect to share to the usual extent, since there was little or no variation in the prices submitted by the various factors. In general, track fastenings are slow. The local standard-section rail maker has a good backlog of 1929 orders and rolling on them will be under way in the next 10 days. Light-section rails are very dull.

Wire Products.—No announcements have been made as to first quarter prices; in view of the tardiness of word on the matter, there is a belief in some quarters that no change is to be made, but some manufacturers intimate that prices soon to be announced will be $2 a ton higher on nails and wire. Business reflects the desire of distributers and consumers to keep down inventories, but runs well up to the average for this time of the year.

Tubular Goods.—Business is fairly active. Makers are better supplied with line pipe orders than with oil country or building construction requirements, but there is some demand for all three classes. Among the projected pipe lines, the one to convey natural gas from Wyoming to Salt Lake City, calling for 350 miles of 14-in., 16-in. and 18-in. pipe, is regarded as nearest the mills.

Sheets.—November proved one of the big months of the year in specifications and will not fall far short of being equally good in shipments. There is now some slowing up in tonnage releases, owing to the desire of consumers to be able to show heavy cash and light materials items in their year-end financial statements. The mills are meeting this situation by applying the clause in contracts which sets up Dec. 10 as the date of final specifications. Attempts by consumers to defer shipments until next month find manufacturers willing if the buyers are prepared to pay the January price, which is $2 a ton higher than that on December shipments. Generally, the mills are driving for specifications, but expect to time shipments in a way that will help buyers to escape heavy stocks on the last day of the year. Producers say that the higher prices announced several weeks ago now are effective, but it is also a fact that most consumers have lower priced contracts that run somewhat to the blanket variety, against which they can specify for any additional early requirements that may develop.

Tin Plate.—Mill operations continue to increase and now average fully 85 per cent of capacity. Early 1929 requirements have been specified rather freely since the announcement on Nov. 15 of the first half price. Sentiment is cheerful as to next year food container requirements. This year's pack of peas, corn and tomatoes is estimated to be below what has come to be regarded as the annual consumptive requirements, and a close clearance of the year's general food pack is looked for before the new crops come in. This condition points

THE IRON AGE Composite Prices

Finished Steel

Dec. 4, 1928, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.369c.
One year ago	2.307c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.369c.,	Oct. 30;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Dec. 4, 1928, $18.59 a Gross Ton

One week ago	$18.59
One month ago	18.34
One year ago	17.59
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$18.59,	Nov. 27;	$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.22c. to 2.32c.
Del'd New York	2.29c. to 2.34c.
Del'd Cleveland	1.92½c. to 2.05c.
F.o.b. Cleveland	1.90c. to 2.05c.
F.o.b. Lackawanna	2.05c. to 2.10c.
F.o.b. Birmingham	2.15c. to 2.25c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham	2.15c. to 2.25c.

Rail Steel

F.o.b. mills east of Chicago dist.	1.85c. to 1.95c.
F.o.b. Chicago Heights mill	1.95c.

Iron

Common iron, f.o.b. Chicago	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c. to 2.25c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.15c. to 2.25c.
F.o.b. Coatesville	2.05c. to 2.15c.
F.o.b. Sparrows Point	2.05c. to 2.15c.
F.o.b. Lackawanna	2.00c. to 2.10c.
Del'd New York	2.22½c. to 2.32½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c. to 2.25c.
F.o.b. Lackawanna	2.00c. to 2.10c.
F.o.b. Bethlehem	2.05c. to 2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.11c. to 2.21c.
Del'd New York	2.19½c. to 2.29½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base per Lb.
6 in. and narrower, P'gh	1.90c. to 2.00c.
Wider than 6 in., P'gh	1.80c. to 1.90c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.85c.
Strips, Cleveland	2.85c. to 2.95c.
Strips, del'd Chicago	3.15c. to 3.25c.
Strips, Worcester	3.00c.
Fender stock, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.20
Barbed wire, painted	2.95

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, W. Va., or Reading, Pa.	$2.75
Less carloads, Wheeling or Reading	2.85

Woven Wire Fence

Base to Retailers per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland	2.19c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c. to 2.85c.
No. 24, f.o.b. Chicago dist. mill	2.85c. to 2.95c.
No. 24, del'd Cleveland	2.94c. to 3.04c.
No. 24, del'd Philadelphia	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh, No. 1 grade	3.90c. to 4.00c.
No. 24, f.o.b. P'gh, No. 2 grade	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.69c. to 3.79c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c. to 4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$3.00
2100	(1½% Nickel)	0.55	3.30
2300	(3½% Nickel)	1.50	4.25
2500	(5% Nickel)	2.25	5.00
3100	Nickel Chromium	0.55	3.30
3200	Nickel Chromium	1.35	4.10
3300	Nickel Chromium	3.80	6.55
3400	Nickel Chromium	3.20	5.95
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.25
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.45
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.80
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.10
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.20
5100	Chromium Spring Steel	0.20	2.95
6100	Chromium Vanadium Bars	1.20	3.95
6100	Chromium Vanadium Spring Steel	0.95	3.70
9250	Silicon Manganese Spring Steel (flats)	0.25	3.00
	Rounds and squares	0.50	3.25
	Chromium Nickel Vanadium	1.50	4.25
	Carbon Vanadium	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	42½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 4½ in.	46	3¼ to 4½ in.	— 9
5 to 6 in.	40		

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	*Charcoal Iron*
Under 5000 lb. — 4 Fives	1 Ten
5000 lb. to 12,000 lb. — 5 Fives	2 Tens
12,000 lb. to 21,000 lb. — 6 Fives	2 Tens & 2½
21,000 lb. and over — 7 Fives	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	45
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Less carload, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

to active packing operations next year, especially as the use of canned foods is gaining from year to year.

Cold-Finished Steel Bars and Shafting.—Since prices are not to be different in the next quarter, the recent opening of books for that period has not been followed by a rush of contracting. Business in the past week showed some gain as compared with the week before, but it is recognized that it will not be until after next month's automobile shows that a clear line will be had on the demand or that there will be real constancy to automobile production.

Hot-Rolled Strips.—The market is clearly quotable at 1.80c. to 1.90c., base Pittsburgh, for strips wider than 6 in. and 1.90c. to 2c., base, for 6 in. and narrower, but with the lower figures the prevailing ones. Prices of 1.80c. and 1.90c., which were supposed to have been reserved for the round tonnage buyers, have been named to some relatively small tonnage users. It seems several of the really large tonnage buyers have not yet spoken for their first-quarter requirements and the market thus has not had the test of important business. Current movement of strips on old orders is holding up well, but new business as a whole is quiet.

Cold-Rolled Strip. — Makers have not encountered much resistance on first-quarter contracts to a price of 2.85c., base Pittsburgh, but small lot buyers are voicing objections to more than that and the really large consumers have yet to do much contracting. There is a fairly well sustained movement on old orders, but order books of makers are growing slimmer.

Coke and Coal.—No further recession has occurred in coke prices, but the market is no more active than it has been, and while supplies are moderate, gaged by ordinary standards, they are quite ample for all requirements. The coal market could hardly be duller than it is, and the concern of producers seems to be greater about keeping their mines going than in the prices they can secure.

Old Material. — Heavy breakable cast scrap has been sold at $13 in the past week, but except for this change, a decline of 50c. a ton, prices are stationary for the second consecutive week. Heavy melting steel still is appraised at $17, sales into consumption at more not being possible, while dealers find it difficult to uncover supplies at less. Steel manufacturers do not find it necessary to supplement deliveries on contracts by fresh purchases, but, on the other hand, the scantiness of supplies makes dealers wary about selling. These circumstances obviate the possibility of much fluctuation in prices. The Pennsylvania Railroad December scrap list, closing Dec. 5, contains almost 50,000 net tons, including 7000 tons in a supplementary list.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel	$17.00
Scrap rails	17.00
Compressed sheet steel	17.00
Bundled sheets, sides and ends	$15.50 to 16.00
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	17.00 to 17.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	17.00
Hvy. steel axle turnings	15.00
Machine shop turnings	10.50 to 11.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	18.50 to 19.00
Railr. coil and leaf springs	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	19.00 to 19.50
Low phos., light grade	18.00 to 18.50
Low phos., sheet bar crops	19.00 to 19.50
Heavy steel axle turnings	15.00
Electric Furnace Grades:	
Low phos. punchings	18.50 to 19.00
Hvy. steel axle turnings	15.00
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
No. 2 busheling	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles	20.00 to 21.00
No. 1 railroad wrought	13.00 to 13.50
Sheet bar crops	18.00 to 18.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	17.50 to 18.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

The Sheet Steel Trade Extension Committee, Terminal Tower Building, Cleveland, is undertaking an extensive campaign to promote the wider use of sheet steel in various fields. The economy, durability and fire-resistiveness of sheet steel will be presented to fabricators, sheet metal contractors and the consuming public through various advertising media.

Textile machinery and parts valued at $100,922,791 were produced in 1927, according to the Bureau of the Census. Other products and receipts for repair work and contract work were valued at $16,095,538, making a total of $117,018,330, a decrease of 3.8 per cent, as compared with $121,653,324 for 1925, the last preceding census year.

Plans Being Pushed for Western Metal Congress

Fourteen metal engineering societies were represented at a preliminary meeting held recently at Los Angeles to make plans for the Western Metal Congress to be held Jan. 14 to 18 at the Biltmore Hotel and the Shrine Civic Auditorium in that city. More than 80 per cent of the display space for the metal and machinery exposition has been subscribed for and the program for the convention sessions is rapidly taking shape. Several of the organizations plan to hold their regular annual meetings during the convention and a special train for Eastern delegates will be run from Chicago over the Atchison, Topeka & Santa Fe Railroad.

The following societies will take part: American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, California division of the American Petroleum Institute, Institute of Metals, American Welding Society, Society of Automotive Engineers, Pacific Coast Electrical Association, Pacific Coast Gas Association, Institute of Marine Engineers, Metal Trades and Manufacturing Association, Chamber of Mines and Oils, National Association of Purchasing Agents, American Foundrymen's Association and American Society for Steel Treating.

W. H. Eiseman, now at the Shrine Civic Auditorium, Los Angeles, is in general charge.

Graham-Paige to Assemble Automobiles in Germany

The Graham-Paige Motors Corporation, Detroit, has acquired a plant of 57,000 sq. ft. of floor space at Johannisthal, Germany, a suburb of Berlin, where Graham-Paige cars will be assembled in the future for distribution in Germany. The German plant of the E. W. Budd Mfg. Co., American body builder, is also located in Johannisthal, as are several other American automotive plants.

All employees of Deere & Co., Moline, Ill., who have been with the company two years or more, will be given an annual vacation of two weeks with pay, according to a recent announcement of William Butterworth, chairman of the board. The order affects about 7000 factory employees, and vacation wages will be governed by the normal wage and length of service of employee.

A 36-in. blooming mill for the Messina, N. Y., plant of the Aluminum Co. of America will be built by the Mesta Machine Co., Pittsburgh, and the order for a 24-in. structural mill for this plant has gone to the Mackintosh-Hemphill Co., Pittsburgh. The Aluminum company is building a plant at Messina for rolling aluminum into structural shapes for railroad cars.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	$33.00 to 34.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh	38.00

Sheet Bars

(Open hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$33.00 to $34.00
Youngstown	33.00 to 34.00
Cleveland	33.00 to 34.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$33.00
Youngstown	33.00
Cleveland	$33.00 to 34.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.40 to $12.00

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.50 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines	90c. to 1.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$31.00 to $32.00	12%	$35.00 to $36.00
11%	33.00 to 34.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$24.00 to $25.00	10%	$29.00 to $30.00
7%	25.00 to 26.00	11%	31.00 to 32.00
8%	26.00 to 27.00	12%	33.00 to 34.00
9%	27.00 to 28.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to $1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Rail Orders Total 42,000 Tons—Inquiry for 3500 Cars—November One of the Best Months of Year

CHICAGO, Dec. 4.—The Chicago iron and steel market can best be characterized as steady, with little evidence of other than moderate changes in the near future. Prices for finished steel for delivery after the turn of the year are holding the attention of many buyers, as indicated by an expanded volume of inquiry. Local producers are noncommittal, but mills in the East which market in this territory have not hesitated to accept future business at 2c. to 2.10c. per lb. for plates, shapes and bars. New orders for rails bulk large, but output remains low, pending releases against 1929 contracts. In some quarters it is thought heavier rollings will be under way by Dec. 15.

Railroads are active in making known their spring needs of track accessories. The Santa Fe has added 3500 freight cars and 50 passenger train cars to its inquiries of a week ago.

Announcement is made today that a local bond house will underwrite an issue for the 1 North La Salle office building, Chicago. Preliminary estimates place the steel requirements at 10,000 tons. The construction field still holds attention because of the volume of pending tonnage; actual awards are few in number and of moderate size.

November sales of finished steel products made it one of the best months in the year; total business was fully 10 per cent heavier than in November, 1927. Shipments in November far outdistanced the volume sent from mills in the same month last year. Sales for the past week were the best in five weeks and specifications also were the largest, with one exception, in four weeks.

Pig Iron.—Prices for Northern pig iron in and near Chicago remain firm at $20 a ton, local furnace. Concessions on boat iron and lower quotations in meeting competition to the East seemingly have had no effect on the local situation. Shipments are steady, but producers expect a drop by Dec. 20, when foundries will slow down for the inventory period and the holiday season. Indications are that shipments in 1928 will at least equal those of the record year of 1926. One producer has advanced the price of Southern iron 50c. a ton, bringing the new quotation to $17, Birmingham, or $23.01, delivered Chicago. The silvery market is quiet, following an active contracting period.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$22.51 to 23.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$30.79 to 31.79
Bess. ferrosilicon, 14-15 per cent	47.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—The Santa Fe has added 3400 freight cars and 50 passenger train cars to its inquiry of last week for 1075 freight cars and 16 baggage cars. The totals now are 4475 freight cars and 56 passenger cars. The steel for these cars will total about 70,000 tons. Local mills compute that 6100 freight cars were purchased by United States railroads in November. New orders for oil storage tanks will take more than 2000 tons of plates, and fresh inquiry from producers of petroleum products in Texas totals 3600 tons. Car shops are beginning to specify against recent orders, but the bulk of plate tonnage being shipped from local mills is going to structural shops and builders of large tanks. Chicago plate mills are engaged at about 80 per cent of capacity.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Ferroalloys.—Shipments of these commodities are in good volume. The spiegeleisen market is quiet. Carloads are being offered at $34 a ton, Hazard, Pa. Several small orders for ferromanganese have been taken at $105 a ton, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Billets.—Sales for delivery over the remainder of this year total 25,000 tons. Specifications are well up to the average of recent weeks.

Cast Iron Pipe.—The cast iron pipe market is stimulated by an inquiry from Detroit for 6000 tons of 24, 36 and 48-in. pipe. In some quarters this request for prices is looked upon as the forerunner of a winter buying movement and as a feeler to determine whether winter manufacturing prices will be obtainable. Although this subject has been given some consideration by sellers, no public announcement has been made as to the course to be taken. Quotations for 6 in. and larger diameter pipe are steady at $37 to $38 a ton, Birmingham. The freight rate to Chicago is $8.20 a ton. Contractors in and around Chicago are placing small tonnages. Several public utilities have asked for preliminary figures for use in estimating budgets for the coming year. Railroads are finding little use for cast iron pipe at this time of the year.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $4 extra.

Bars.—Shipments of bar mill products to manufacturers of automobiles are not greater than in late November, but builders are looking forward to an active demand for their products soon after the turn of the year. Shipping schedules now arranged for late December and early January are large. Specifications from the agricultural machinery trade in November were the heaviest on record, and the rate of shipping is undiminished. Deliveries on mild steel bars range from four to five weeks. Spot sales of iron bars are numerous at current quotations. Contracting in alloy steel bars is making headway. Shipments to most consumers are lighter as users attempt to hold stocks to the minimum. Forward contracting in rail steel bars is not being pushed by producers, but when tonnages are offered for delivery in the first quarter the price named is 1.95c. per lb., Chicago Heights. Specifications are in larger volume than shipments and deliveries have been extended. Both Chicago Heights mills continue to operate on double turn.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Structural Material.—Structural steel awards in the week totaled 1900 tons and fresh inquiry amounts to 3000 tons. Preliminary figures are being taken on a building to be erected at 1 North La Salle Street, Chicago; it is reported that 10,000 tons of steel will be needed.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Rails and Track Supplies.—Sales of standard-section rails total 42,000 tons. Included in this figure are 28,000 tons for the Chicago & North Western, 10,000 tons for the Wabash and 4000 tons for the Missouri-Kansas-Texas. Inquiry is slow, although several sizable orders are in the making. Four Western railroads have closed for 25,000 tons of track accessories for delivery in 1929. Fresh inquiry totals about 20,000 tons. In the local market prices for tie plates are steady at $43 a ton. Inquiry before the trade for iron tie plates reaches a total of 10,000 tons. Standard-section rail production in this district is being held to a low rate, but rolling schedules against 1929 contracts are expected to be put in effect about Dec. 15.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—Buyers are being offered first quarter contracts at prices which prevailed in the fourth quarter. Current specifications are lighter, but operations are being held at an unchanged rate, so that producers may expand stocks.

Sheets.—Forward contracting is moving slowly. There is still a large tonnage to be specified against fourth quarter contracts. Spot purchases, except by consumers who do not normally contract, are negligible. Current specifications are a trifle heavier, and mills are operating at a higher rate, the range now being between 75

and 80 per cent of capacity. The roofing trade remains quiet. Jobbers are moving sizable tonnages from stock. Demand from agricultural implement manufacturers is turning upward. Deliveries are improving, common finishes now being obtainable in 10 days.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c. to 3.00c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars.—Local dealers in billet steel reinforcing bars have named 2.35c. per lb. as the minimum on carlot orders and producers are asking 2c. to 2.10c. per lb. for carloads in mill lengths of 40, 50 and 60 ft. Lower quotations by dealers are not to be withdrawn for several weeks. New prices for rail steel reinforcing bars are 2.05c., Chicago Heights, to the general trade and producers are asking 1.95c. for carload orders in mill lengths. Rolling schedules at billet bar mills are arranged unsatisfactorily for bending shop needs. With bar fabricators operating at only 50 per cent of capacity, deliveries from mills are such that some construction programs cannot be held to schedule. Contracts are few in number, but inquiry is active and estimating bureaus are busy.

Old Material.—The movement of heavy melting steel to local mills is steady as dealers press to cover old contracts taken at $15 a gross ton, delivered. Consumer purchases of this grade are lacking, but dealers, who are looking for steady if not higher prices after the turn of the year, are anxious to complete old obligations and they do not hesitate to trade at the prices named in recent heavy tonnage contracts. The supply of cast iron borings is ample to meet current needs of consumers. Shipments are materially lighter from automobile manufacturers. The embargo against shipments recently put in effect by merchant furnaces has been lifted and borings are again moving freely to those consumers. For this grade dealers are paying $12 to $12.25 a ton, delivered, against old contracts. Demand for railroad malleable is active at $16.50 a gross ton for local delivery, but 50c. above this price is obtainable for prompt shipment to outlying points. A melter has closed for 1000 tons of stove plate at $12.75 a net ton, delivered, which is an advance of 25c. a ton in the week. Plate scrap is scarce and little relief is looked for by the trade until February or March, when it is expected that railroad car shops will be in heavier production. The demand for short rails, 2 ft. and under, is insistent. This specification is more to the liking of users than the older 3 ft. and under lengths. The Chicago & North Western will close a list this week.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$14.50 to	$15.00
Shoveling steel	14.50 to	15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to	16.25
Hydraul. compressed sheets	13.00 to	13.50
Drop forge flashings	10.50 to	11.00
Forg'd, cast and r'l'd steel carwheels	17.75 to	18.25
Railr'd tires, charg. box size	17.50 to	18.00
Railr'd leaf spring cut apart	17.50 to	18.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	16.00 to	16.50
Coil springs	18.25 to	18.75
Electric Furnace Grades:		
Axle turnings	14.25 to	14.75
Low phos. punchings	16.50 to	17.00
Low phos. plate, 12 in. and under	16.00 to	16.50
Blast Furnace Grades:		
Axle turnings	12.00 to	12.50
Cast iron borings	11.75 to	12.25
Short shoveling turnings	11.75 to	12.25
Machine shop turnings	8.00 to	8.50
Rolling Mill Grades:		
Iron rails	15.00 to	15.50
Rerolling rails	16.50 to	17.00
Cupola Grades:		
Steel rails less than 3 ft.	17.25 to	17.75
Steel rails less than 2 ft.	19.00 to	19.50
Angle bars, steel	16.50 to	17.00
Cast iron carwheels	14.25 to	14.75
Malleable Grades:		
Railroad	16.50 to	17.00
Agricultural	12.50 to	13.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angles and splice bars	14.50 to	15.00
Iron arch bars and transoms	20.50 to	21.00
Iron car axles	26.50 to	27.00
Steel car axles	15.50 to	16.00
No. 1 railroad wrought	13.25 to	13.75
No. 2 railroad wrought	13.00 to	13.50
No. 1 busheling	11.50 to	12.00
No. 2 busheling	6.00 to	6.50
Locomotive tires, smooth	13.25 to	13.75
Pipes and flues	9.50 to	10.00
Cupola Grades:		
No. 1 machinery cast	15.50 to	16.00
No. 1 railroad cast	15.00 to	15.50
No. 1 agricultural cast	14.50 to	15.00
Stove plate	12.25 to	12.75
Grate bars	12.50 to	13.00
Brake shoes	11.50 to	12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Wire Products.—Improvement noted a week ago in sales of woven wire fencing is sustained, but the tonnages on the books of producers are far below those usual this late in the fall. Specifications for this commodity are more liberal from the South and Southwest, where weather conditions are favorable for outdoor work. Demand for nails is light, sustaining output of not more than 30 per cent of capacity; the total tonnage so far this year is far below the volume of orders taken in 1927. The display of new automobile models is resulting in larger demands from several car manufacturers in the Detroit district, and accessory makers in and around Cleveland are also taking larger quantities of wire. The jobbing trade is well sustained in parts of the country where severe weather has not been experienced. Distributers generally are holding stocks to a minimum and are ordering extremely close to actual requirements. Inquiry for first quarter is more active, but producers are holding back the opening of books for that period.

Coke.—Forward contracting for the first half of 1929 is active. Deliveries remain on a par with those of a week ago.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.50c.
Reinforc'g bars, rail steel	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.65c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, stand. railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.30
Com. wire nails, base per keg	3.10
Cement c't'd nails, base per keg	3.10

Shipments of Sheet-Metal Ware Increase

WASHINGTON, Dec. 4.—Shipments of galvanized sheet-metal ware in October included 206,854 dozens, valued at $832,243, as compared with 189,789 dozens, valued at $742,188 in September and 182,469 dozens, valued at $724,692 in October, 1927, according to reports received by the Department of Commerce from 15 concerns comprising a large proportion of the industry.

October shipments of enameled sheet-metal ware were 417,387 dozens, valued at $1,650,657, as compared with 352,484 dozens, valued at $1,372,242 in September and 322,081 dozens, valued at $1,297,431, in October, 1927, according to reports received by the Department of Commerce from 18 manufacturers comprising approximately 80 per cent of the industry.

A continuous furnace for heating slab ingots is to be built at the plant of the Dominion Foundries & Steel, Ltd., Hamilton, Ont., by the Rust Engineering Co., Pittsburgh. The furnace will employ the Rust double firing principle in which a separately fired soaking chamber is utilized to equalize the temperature of the slab ingots before discharging. The furnace is approximately 60 ft. in length and 15 ft. in width, and will use coke oven gas as fuel.

An exposition of modern American industrial and decorative arts will take place in Chicago in January. It will embrace decorative work and include metalwork as well as lamps and lighting fixtures. Interiors will represent respectively a modern business office, a Pullman compartment, a passenger airplane interior, etc. James D. Cunningham, president Illinois Manufacturers' Association, is executive director of the exposition.

Philadelphia

No Price Change for First Quarter on Plates, Shapes and Bars—Shipbuilders Inquire for Large Tonnages

PHILADELPHIA, Dec. 4.—First quarter contracts on steel bars and plates will be closed at the current contract prices, instead of at an advance suggested by mills several weeks ago. Some small tonnages of bars are reported to have been closed at 1.95c., Pittsburgh, and plate mills are quoting 2.05c. to 2.10c., Coatesville, on contracts. Sheet mills are maintaining a firm attitude on prices, but consumers are not yet showing much interest in future buying. The opening of bids on 700 tons of black, galvanized and blue annealed sheets by the Pennsylvania Railroad brought out the current market prices at mill, except in the case of blue annealed sheets, on which one eastern Pennsylvania maker quoted 2c., mill, for delivery to Dec. 31, but 2.10c., mill, for first quarter.

Construction projects are less numerous, but shipbuilders are providing substantial prospective business in plates for work on which they are bidding. A Camden, N. J., yard has inquired for prices on about 60,000 tons of plates and about 15,000 tons of shapes for six ships, awards of which are pending.

Ferromanganese.—Most consumers have contracted for part or all of next year. The price is $105 per ton, seaboard, quoted by domestic and foreign producers.

Pig Iron.—Orders for 25,000 tons of basic iron, reported last week as placed by an eastern Pennsylvania consumer, are understood to have been distributed among three producers. The tonnage was bought at a price quoted when the inquiry was issued about a month ago. Furnaces are now quoting on a basis of about $20 per ton, furnace, or a 50c. a ton advance. Foundry iron is steady at $21 per ton for first quarter; contracting is light. Activity by shipbuilders is beginning to develop some tonnage, and the Sun Shipbuilding & Dry Dock Co., Chester, Pa., is inquiring for about 500 tons of foundry grade. The Pusey & Jones Co., Wilmington, Del., is expected to inquire before the end of the year for a small tonnage. The Standard Steel Works Co., Burnham, Pa., is inquiring for 2500 to 3000 tons of low phosphorus. The Virginia pig iron producer has advanced its prices 50c. a ton, following an increase in the Birmingham market.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	20.25 to 20.75
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25	25.29
Va. No. 2X, 2.25 to 2.75 sil.	25.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Contracts for first quarter have been closed for small tonnages, and the prices to larger buyers are 1.90c. to 1.95c., Pittsburgh, or 2.22c. to 2.32c. per lb., delivered Philadelphia. A substantial tonnage of reinforcing bars will be required for the Reading Commercial Building, which was originally planned for structural steel, but is now designed for nine stories of reinforced concrete and three of structural.

Shapes.—Except on especially desirable business, 2.05c., f.o.b. nearest mill to consumer, is being quoted by eastern Pennsylvania mills. On a Pencoyd, Pa., basis this would be 2.11c., delivered Philadelphia. The successful bidder on a recent structural steel contract of 2700 tons used a price of 2c., mill, on the plain material, THE IRON AGE is informed, and a lower price on the shapes, mentioned in this column last week, appears to have been the basis of a bid by one of the unsuccessful contractors. Construction projects have declined recently and the tonnage in the Reading Commercial Building revised to call for part reinforced concrete construction has been reduced to about half the former total of 16,000 tons. A Camden shipbuilder, bidding for the contracts to build two Ward Line and four Matson Line ships, is seeking prices on about 15,000 tons of shapes. About 1600 tons of shapes for a ship contract has been placed by the Sun Shipbuilding & Dry Dock Co., Chester, Pa., with the Carnegie Steel Co.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, 5/16-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to 5/16-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
5/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Plates.—Protection is being given on substantial tonnages of plates required in pending shipbuilding contracts. The New York Shipbuilding Corporation, Camden, N. J., is inquiring for 12,000 tons of plates for two ships for the Ward Line and for 50,000 tons of plates for four Matson Line vessels. Although the Di Giorgio Fruit Co. is reported to have bought two or more ships in Europe, the present inquiry of that line for one or two ships to be built here has not been withdrawn. About 7000 tons of plates for an American South African Steamship Co. liner to be built by the Sun Shipbuilding & Dry Dock Co., Chester, Pa., has been awarded to the Carnegie Steel Co. The Pusey & Jones Co., Wilmington, Del., has awarded 1500 tons of plates and a small tonnage of shapes for three private yachts to the Bethlehem Steel Co. Plate prices continue at 2.05c. to 2.10c., Coatesville, or 2.15c. to 2.25c., Philadelphia.

Sheets. — Mills are maintaining 2.10c., Pittsburgh, on blue annealed; 2.85c., Pittsburgh, on black, and 3.60c., Pittsburgh, on galvanized sheets for first quarter delivery, but contracting has not developed to any extent. Bids on 700 tons of sheets for the Pennsylvania Railroad were at these prices, f.o.b mill, except in the case of blue annealed sheets, on which one maker quoted 2c., Pittsburgh, for delivery to Dec. 31 and 2.10c. per lb. for the first quarter.

Imports.—In the week ended Dec. 1, 6700 tons of iron ore arrived at this port from Algeria and 152 tons of pig iron from Holland. Steel imports consisted of 65 tons of steel bars from Belgium and 36 tons of structural shapes and 10 tons of wire rods from Germany.

Old Material.—Except for a small tonnage of No. 1 heavy melting steel bought by a Claymont, Del., consumer at $15 per ton, delivered, the iron and steel scrap market has been decidedly inactive.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.00 to $16.00
Scrap T rails	14.50 to 15.00
No. 2 heavy melting steel	12.25 to 12.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.25
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	16.50 to 17.00

Cleveland

Mills Announce Continuance of Fourth Quarter Prices of Plates, Shapes and Bars for First Quarter

CLEVELAND, Dec. 4.—Most of the leading producers have announced a continuation of the fourth quarter prices for first quarter contracts on steel bars, plates and shapes. This means a range of from 1.90c. to 2c., Pittsburgh, but producers expect to maintain a minimum of 1.95c. on most business. When Cleveland is used as a basing point for steel bars, the present range of 1.95c. to 2.05c., Cleveland, is continued by outside mills. Local bar mills expect to continue their 1.90c. mill base. While a few first quarter contracts have been written, mills are not pressing consumers for contracts. Specifications fell off the past week, particularly for steel bars, sheets and strip steel.

With the slowing down in production due to bringing out new models and the reduction of stocks for inventories, most of the automobile companies have curtailed their steel shipments for December, but the release of large tonnages is expected from this source for January shipment. One maker of low-priced cars has placed a large order for alloy steel bars for the first quarter. Some of the stamping plants in this territory have taken considerable automotive work against which they have not yet secured releases. This is causing a holding back of sheet specifications. Some of the mills can still take on a little tonnage in hot and cold-rolled strip steel for December shipment.

Plates are moving rather slowly. The American Shipbuilding Co. has taken ship repair work requiring 600 tons, which has been placed with a Pittsburgh district mill. The Pittsburgh Steamship Co. has taken bids on two large freight boats. Not much new work is developing in the building field.

Iron Ore.—The ore shipping season closed during the week with a total movement from the Lake Superior district of 53,980,874 gross tons, or about 3,000,000 tons more than during the previous year. This season's shipments were exceeded in only four of the past 10 years. Shipments in November were 4,260,942 tons, or more than double the November movement in 1927. Stocks at furnaces and at Lake Erie docks on Dec. 1 were approximately 39,500,000 tons, or 2,000,000 tons less than the amount at furnaces and docks on the same date a year ago. If the present rate of consumption is maintained, dock and furnace stocks on May 1 next year will be considerably less than on the corresponding date this year. However, consumers have secured shipments of all the ore that they expect to need before the opening of navigation, and while some stock piles may become well exhausted during the winter, a shortage is not looked for. The amount on docks and furnace yards May 1, this year, was 19,570,000 tons. Tabulation of shipments for November and for the season and for the past 10 years, as prepared by the Lake Superior Iron Ore Association, will be found in another column.

Pig Iron.—Sales declined the past week, this evidently being partly due to the holiday. Cleveland interests during the week sold 32,000 tons in foundry and malleable grades, mostly for the first quarter. Few consumers are showing an interest in contracts beyond the first quarter. Inquiry is somewhat lighter. November shipments by some producers exceeded their production, and indications point to heavy shipments during December. While some of the automotive and stove and furnace foundries are curtailing operations this month and will take less pig iron, this decline in the demand will to some extent be offset by increased shipments to some of the other automotive foundries. Prices are firm and without change. One Valley furnace appears to have become rather active in parts of the Indiana territory, where it has made a few sales of foundry iron. An $18 Valley price brings that grade to some Indiana points at a slightly lower price than the delivered price of Lake furnace iron. Cleveland furnaces are holding to $18.50 for foundry and malleable iron for outside shipment and one Lake furnace to $19.50 for its nearby territory. In Michigan, the market is firm at $20.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	$22.50 to 23.00
Malleable	19.50
Ohio silvery, 8 per cent	29.00 to 30.00
Basic Valley furnace	17.50 to 18.00
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Ferroalloys.—Most consumers of spiegeleisen were covered by contracts before the recent $1 a ton advance in prices. Some consumers have placed contracts for ferromanganese at $105 a ton, and other business is pending.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*3.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.45c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.85
No. 9 gal. wire, per 100 lb.	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Sheets.—Specifications have fallen off considerably, reflecting the slowing down of the automotive industry and the approach of inventory time. However, mills have received some good specifications, mostly for auto body sheets, for January shipment. Most mills have a good backlog to tide them over until next month. Some first quarter contracts are being placed, and there is a limited amount of early shipment business. Part of this is being taken at the new prices, but some of the mills that can take orders for December rolling are entering these at the old prices. Regular prices are firmly maintained for first quarter contracts.

Cold-Finished Steel Bars.—With the reestablishment of present prices on cold-finished steel bars for the first quarter, a $5 a ton reduction has been made on cold-drawn alloy bars, this being effected by reducing from $1 to 75c. per 100 lb. the differential over hot-rolled alloy bars. One producer made this reduction a few days ago and others decided to meet it. The reestablishment of the present cold-finished steel bar price is expected to result in considerable falling off in specifications this month, as consumers will reduce their stocks for inventories.

Reinforcing Bars.—New inquiry is limited to small lots. Both mill and warehouse prices continue irregular on new billet steel bars. Rail steel bars are unchanged at 1.90c., mill.

Semi-Finished Steel.—Specifications are holding close to recent volume. Not much contracting has as yet been done for the first quarter, for which a local producer is holding to $34, mill, for sheet bars, billets and slabs.

Wire Products. — Manufacturers' wire continues in good demand, but nails are moving slowly. First quarter prices have not yet been named.

Warehouse Business.—This shows the seasonal slowing down in all commodities. Jobbers are still using the old card of extras for hoops and bands, but expect to adopt the new card Jan. 1.

Strip Steel.—While concessions of $2 a ton from regular prices are being made on hot-rolled strip to round lot buyers, mills appear to be holding firmly to the regular 2c., Pittsburgh, base for widths narrower than 4 in. Few mills make the narrow strip, and deliveries are more extended on this than on the wide material, some of the mills making the narrow strip being filled up into January. Cooperage stock is being maintained at the regular 2.10c. base. With the new card of extras, present prices on narrow strip are from $2 to $4 a ton higher than those that prevailed on fourth quarter contracts, but the advance is smaller on wide strip. Quite a number of first quarter contracts have been entered. Cold-rolled strip is firm at 2.85c., Pittsburgh and Cleveland, for round lots. Most of the mills are asking 2.95c. for small lots.

Bolts, Nuts and Rivets.—The de-

mand for bolts and nuts is still good. Specifications from jobbers have declined, as usually happens at the approach of inventory time, but the demand from the automotive industry has increased. Rivets are moving in good volume. Present prices on bolts, nuts and rivets probably will be reaffirmed for the first quarter. With steel bars unchanged for that delivery and an advance in wire in doubt, makers see no reason to change prices.

Coke.—Specifications are fair, but there is very little new business. Prices are unchanged. Ohio by-product foundry coke is quoted at $7.75, Painesville, for December shipment. The demand for domestic coke is rather slow.

Old Material.—There is not much activity in the market, which remains firm at recent prices. While mills have good stocks, they continue to take shipments in fair volume, and dealers apparently are buying enough scrap to fill outstanding orders to sustain prices at present levels. Scrap is coming out in plentiful volume at these prices.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	14.00 to 14.50
Compressed sheet steel	14.00 to 14.50
Light bundled sheet stamp'gs	12.00 to 12.50
Drop forge flashings	12.25 to 12.75
Machine shop turnings	9.50 to 10.00
No. 1 railroad wrought	12.75 to 13.00
No. 2 railroad wrought	14.50 to 15.00
No. 1 busheling	12.25 to 12.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops	16.00 to 16.50
Low phos., billet, bloom and slab crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings	11.00 to 11.50
Mixed bor'g and short turn'gs	11.00 to 11.50
No. 2 busheling	11.00 to 11.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	16.75 to 17.25
Miscellaneous	
Railroad malleable	16.00 to 16.50
Rails for rolling	16.25 to 16.50

New York

Pig Iron Sales Total 18,000 to 19,000 Tons—4000 Tons of Sheet Steel Piling Placed

NEW YORK, Dec. 4.—A total of 18,000 to 19,000 tons of pig iron was closed in the past week by sellers in this district. Consumers are maintaining a steady interest in first quarter requirements, and it is estimated that about 50 per cent of the total needed for this period has been covered by contracts. Despite efforts of Buffalo producers to maintain $18 per ton, $17.50 seems to be obtainable on desirable tonnages and eastern Pennsylvania sellers have quoted competitive prices. About 5000 tons of foundry iron for the Dundalk, Md., plant of the Central Foundry Co. has been placed, the greater part reported to have gone to the New England producer for water delivery. The Eagle Iron & Brass Foundry Co., Passaic, N. J., has closed on 2000 tons of foundry iron with a Buffalo furnace. Among current inquiries for first quarter delivery are 500 tons of foundry iron for the Lancaster, Pa., plant of the Burnham Boiler Corporation, Irvington, N. Y.; 150 tons of low silicon foundry iron for the A. P. Smith Mfg. Co., East Orange, N. J., and about 600 tons of foundry grade for the Hilles & Jones plant of the Consolidated Machine Tool Corporation, Rochester, N. Y.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.52
East. Pa. No. 2X fdy., sil 2.25 to 2.75	21.39 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Reinforcing Bars.—The market has had little activity in the past week. Interest still centers in the 8500 tons of bars required for the Delaware, Lackawanna & Western terminal at Jersey City. These bars will be bought by the Turner Construction Co., general contractor. The contract is likely to be closed during the week. No new projects of outstanding size have come out recently. The general run of small orders is keeping up to expectations for this time of the year. Prices are unchanged.

Warehouse Business.—Prices of black and galvanized sheets have been advanced in the New York district 20c. per 100 lb. on black, to 4.00c., base, and 25c. per 100 lb. on galvanized, to 4.75c., base. For delivery to consumers in northern New Jersey, the black sheet price continues at 4c., base, and galvanized sheets have been advanced 5c. per 100 lb., to 4.75c. The advance is attributed to the strong mill situation rather than to increased local demand. Continued mild weather is contributing to an active market for structural material and some substantial plate orders have been taken recently.

Plates, Shapes and Bars.—Developments of the week have made certain that there will be no advance in prices of plates, shapes and bars for first quarter contracting. Some companies have informed their customers that their books are open at the fourth quarter prices of 1.90c. and 1.95c., Pittsburgh, or $3 higher at Eastern plate and shape basing points. Specifications have fallen off somewhat, but are expected to take an upward turn the middle of the month, when grace expires for entering shipping orders against fourth quarter contracts. One of the largest awards of the week was 4000 tons of sheet steel piling to be furnished by the Bethlehem Steel Co. for a warehouse for the Delaware, Lackawanna & Western Railroad near Jersey City. The city

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 *in.*)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 *in.*)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

of New York will require 2800 tons of 60-in. steel pipe for a water line in Queens Borough, on which bids will be taken in about a month. Another municipal project calls for 600 tons of 48-in. pipe for Manhattan.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c., bar iron, 2.14c. to 2.24c.

Cast Iron Pipe.—Private buyers of gas and water pipe are actively inquiring for small lots and some of the usual large tonnages of gas pipe have appeared for spring delivery. About 15,000 tons of gas pipe for the American Light & Traction Co., New York, is understood to have been awarded to the United States Cast Iron Pipe & Foundry Co. A local New Jersey company is asking for bids on about 200 tons of gas pipe, and E. L. Phillips & Co., 30 Church Street, New York, are inquiring for about 850 tons of gas pipe for the Long Island Lighting Co. The Stamford Water Co., Stamford, Conn., is in the market for 700 tons of water pipe. Quotations of northern foundries are steadier, but $38.60 to $39.60 per net ton, delivered New York, is still a fair range of the market.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, $38.60 to $39.60; 4-in. and 5-in., $43.60 to $44.60; 3-in., $53.60 to $54.60; Class A and gas pipe, $4 to $5 extra.

Sheets and Strip.—A small amount of first quarter contracting has been done in sheets and strips, and in all instances the higher prices have applied. It is expected that this month will bring heavy specifying against fourth quarter contracts for hot-rolled strip because the new base prices, plus the new extras, will mean an advance in first quarter of $2 to $4 a ton on many widths and gages.

Coke. — Connellsville prices on standard foundry and furnace grades are less firm than a week ago, but no definite decline in prices has appeared. Standard foundry continues at $3.50 to $3.75 per net ton, Connellsville, and standard furnace at $2.85 to $3.05 per ton, Connellsville. Special brands of foundry coke are quoted at $4.85 per net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44, to New York or Brooklyn. The West Virginia producer of by-product foundry coke has not yet opened its books for next year. By-product foundry coke prices are unchanged at $9 to $9.40, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Recent sales of No. 1 heavy melting steel to eastern Pennsylvania consumers have been at $15 and $15.50 per ton, delivered, the higher price having been on about 1000 tons and the lower quotation on about 500 tons. Heavy breakable cast has been sold at $15.50 per ton, delivered, and brokers are offering $15 per ton on deliveries to eastern Pennsylvania users. The local stove plate market shows less strength and brokers are offering $11.25 per ton, delivered to West Mahwah, N. J., a reduction of 25c. per ton. Although buying is light, dealers report only a small tonnage of scrap obtainable at the present level of prices.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$11.25 to	$12.00
Heavy melting steel (yard)	8.25 to	8.50
No. 1 hvy. breakable cast.	11.25 to	11.75
Stove plate (steel works).		8.50
Locomotive grate bars....		8.50
Machine shop turnings....	7.25 to	7.50
Short shoveling turnings..	7.25 to	7.50
Cast borings (blast furn. or steel works).....	6.75 to	7.00
Mixed borings and turnings	6.75 to	7.00
Steel car axles	17.50 to	18.00
Iron car axles	25.25 to	26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)		10.75
Forge fire	8.00 to	8.50
No. 1 railroad wrought...	12.25 to	12.75
No. 1 yard wrot., long.....	11.25 to	11.75
Rails for rolling.....	13.00 to	13.50
Cast iron carwheels.....	12.00 to	12.50
Stove plate (foundry)....	9.25 to	9.50
Malleable cast (railroad)..	10.00 to	10.50
Cast borings (chemical)..		11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.).....	14.50

Unique Steel Structure for Diabetes Patients

THE spherical steel structure shown in the illustration is a large tank just completed at the Cunningham Sanitarium, Cleveland, for use in a new treatment for diabetes and allied diseases that requires the patients to be kept for a considerable time under prescribed air pressure. Fabricated and erected by the Biggs Boiler Works Co., Akron, Ohio, the tank is 64 ft. in diameter and its outside shell is made of ¾-in. flanged steel plate. Its construction required 600 tons of steel. While the fabricating problems involved in building the shell did not differ materially from those met in other classes of work in tank and boiler shops, difficulties were encountered because of the large size of the tank.

All seams were closed with double butt straps and double riveted with 1⅛-in. rivets. When the last course of plates had been put in place, the top plate was dropped in place with perfectly matched rivet holes. This indicates the accuracy with which the work was fabricated and erected in the field. The sphere has 349 special port lights, part of which are equipped with aluminum covers on the inside. These lights are constructed to open inward on hinges and carry 1⅛-in. glass.

Inside the sphere a complete five-floor structural building was erected. The interior steel work was designed to allow for contraction and expansion of the outside structure. The sphere rests on 12 cast steel base lugs, which in turn are supported on concrete bars tied together with a reinforced circular mat. The whole is designed to withstand a wind pressure of 100 miles an hour.

In addition to the sphere there are two air locks, one 16 ft. in diameter and 35 ft. long and the other 16 ft. in diameter and 70 ft. long. Both are equipped with port holes and divided into rooms with a corridor through the center. Connection with the sphere is made by an entrance lock 10 ft. in diameter and 20 ft. long in the shape of a T. This arrangement allows for using different air pressures between the locks and sphere. The entire equipment is designed for 30-lb. air working pressure and was tested at 50 lb.

The project was financed personally by H. H. Timken, president, Timken Roller Bearing Co., Canton, Ohio.

Inside This Sphere Are a Dining Room, 36 Private Rooms and a Recreation Room, All Served by an Electric Elevator in the Center

Cincinnati

General Advance of 50c. on Southern Pig Iron Expected—Automobile Companies Specify Sheets Heavily

CINCINNATI, Dec. 4.—Southern furnace interests, with the exception of one Alabama producer, still are quoting $16.50, Birmingham. That an increase to $17 a ton may become general in a few days or a week is predicted by sellers. Sales the past week were comparatively small and were in sharp contrast with the heavy orders of the previous week. The most important order was for 1500 tons of Northern foundry iron for a nearby consumer. A feature of the market has been the crossing in numerous instances of the lines marking the normal boundaries of the selling territories of certain furnaces. Small quantities of Valley iron are being shipped into Cincinnati and also are going into western Ohio and into Indiana. Other makers have also been taking tonnages which usually are supplied by Lake Erie furnaces. Brokers have been selling small lots of southern Ohio iron at $18.50, base Ironton, which is the price asked by the Marting Iron & Steel Co. for the iron remaining on its yards. Jackson County silvery iron is quoted at $26 to $27, base Jackson, for 8 per cent; since users are well covered for first quarter requirements at the old price, the new schedule probably will not be thoroughly tested for some time.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.39
Ala. fdy., sil. 1.75 to 2.25	$20.19 to 20.69
Ala. fdy., sil. 2.25 to 2.75	20.69 to 21.19
Tenn. fdy., sil. 1.75 to 2.25	20.19
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—An increased volume of sheet steel specifications from automobile makers getting into production on new models has given added strength to the position of district mills. Moreover, the liberal flow of tonnage from the Detroit district has been supplemented by well diversified bookings from other sources, so that backlogs insure the continuation of mill operations at 100 per cent of capacity for at least several weeks. The new prices are holding firm under the test of first quarter buying. Sales of reinforcing bars have been somewhat meager. A maker of rail steel bars is quoting 1.90c. to 1.95c., base mill. The movement of bars, structural shapes and plates has been only fair. Common wire nails are being sold at $2.69 per keg, delivered Cincinnati.

Coke.—By-product foundry coke will remain at $7, ovens, during December, but No. 2 nut and walnut sizes have gone up 25c. a ton to $3.50 and $4, ovens, respectively. Egg size is unchanged at $5, ovens. An advance of 50c. a ton on all grades of domestic by-product coke is predicted for Jan. 1. At Detroit, by-product foundry is quoted at a local delivered price of $9. Domestic grades at Detroit are firm and unchanged, but there may be an increase of 50c. a ton on Dec. 15. Shipments of by-product foundry coke in November were about 20 per cent less than in October, and specifications this month may show a further recession on account of the reluctance of users to take material at or near inventory time. Sales of by-product domestic coke were about 10 per cent larger in November than in October. New River beehive foundry coke is quoted at $6 to $6.50, ovens, and Wise County foundry at from $4.50 to $5.25.

Old Material.—Steel plants are accepting less scrap on current contracts than a week ago. Railroad offerings purchased in the past few days by local dealers are reported to have brought less than in the early part of November. However, the market is holding fairly steady, and prices probably will stop at or near present levels until after the first of the year. The Southern has sold a special lot of about 2500 tons of steel rails.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	13.25 to 13.75
Loose sheet clippings	9.50 to 10.00
Bundled sheets	10.25 to 10.75
Cast iron borings	9.00 to 9.50
Machine shop turnings	8.50 to 9.00
No. 1 busheling	10.75 to 11.25
No. 2 busheling	6.25 to 6.75
Rails for rolling	14.00 to 14.50
No. 1 locomotive tires	14.00 to 14.50
No. 2 railroad wrought	13.00 to 13.50
Short rails	19.00 to 19.50
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	14.75 to 15.25
Burnt cast	10.50 to 11.00
Stove plate	10.50 to 11.00
Brake shoes	10.25 to 10.75
Railroad malleable	13.75 to 14.25
Agricultural malleable	12.75 to 13.25

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-weld. steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

St. Louis

Pig Iron Buying in Smaller Volume But Prices Are Firm—Steel Bookings Steady

ST. LOUIS, Dec. 4.—The sale of 5000 tons of basic iron by the St. Louis Gas & Coke Corporation to an East Side melter for shipment in December was the principal transaction of the week, in which a total of 7450 tons was sold by the local maker and 1000 tons by a leading Southern interest. The lull, following weeks of heavy buying, seems to indicate that the bulk of first quarter buying is over, although an attractive tonnage is yet to be covered. While the market is still strong and prices unchanged, the tone is not quite as good as it has been, because there is a feeling that present prices will tempt makers to overproduce. The local maker sold 2450 tons of foundry iron, including 350 for immediate shipment and the remainder for first quarter delivery. Stove foundries continue active, and orders for railroad car parts are materially increasing the melt.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	20.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 81c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Consumption of foundry coke continues on a large scale as a result of the heavy melt in the district, the November consumption being nearly 4 per cent greater than in October. However, buying continues on a hand-to-mouth basis. Domestic grades are moving more rapidly.

Finished Iron and Steel.—Total bookings of new business by the Granite City Steel Co. were slightly greater during November than in the

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.95c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.15c.
Galv. corrug. sheets	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

preceding month. The demand for black, galvanized and blue annealed sheets is well sustained. However, plate business lags, and the volume of tin plate orders is somewhat smaller. Prices continue firm. Warehouse business is satisfactory. Structural fabricators report business is light.

Old Material.—The market for old material is quiet. Mills in the district are delaying all buying, except for fill-in material, until after inventories have been taken, being in a good position to do this because of ample stocks on hand or purchased. Dealers are anticipating a heavy buying movement the latter part of December or the first week in January and have been offering high prices for railroad scrap. The only price changes are in steel car axles and cast iron carwheels, which are 50c. a ton higher. Railroad lists include: Baltimore & Ohio, 13,910 tons; New Orleans & Great Northern, 57 tons; Missouri Pacific, 106 carloads; Frisco Lines, 21 carloads; Mobile & Ohio, 24 carloads; Chicago, Milwaukee, St. Paul & Pacific, 40 carloads; and Louisville & Nashville, 7869 ft. of 68-lb. rails.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.25 to $13.75
No. 2 heavy melting or shoveling steel	12.25 to 12.75
No. 1 locomotive tires	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.00 to 15.50
Railroad springs	16.00 to 16.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.25 to 13.75
No. 1 busheling	9.50 to 10.00
Cast iron borings	8.75 to 9.25
Iron rails	13.50 to 14.00
Rails for rolling	15.50 to 16.00
Machine shop turnings	9.00 to 9.50
Steel car axles	19.50 to 20.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	12.50 to 13.00
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.50 to 15.00
No. 1 machine cast	15.50 to 16.00
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	14.00 to 14.50
Stove plate	12.50 to 13.00
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Cast Iron Pipe.—Pressure pipe makers are booking odd lots for private and contract work, but the total volume is small and below the average for this season. Several municipal feelers for winter buying have come in during the past week and makers are hopeful of specifications by the end of the year. All plants are operating on reduced schedules. Very little stock is being carried and output is being gaged by demand. Quotations are unchanged at $37 to $38 on 6 in. and larger sizes.

Coke.—Prospects are brighter for foundry coke. Industrial coke users are covering for the first quarter and interest is also being shown in second quarter. Sales of domestic coke continue at a fairly active rate. Quotations remain at $5.

Old Material.—Buying is spotty, with the aggregate below the average for November. Lessened production in some fields is having its effect on consumers' demands. Consumers are keeping stocks light for approaching inventories. Prices are the same as quoted last week.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	$12.00 to 12.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Birmingham

Heavy Buying of Pig Iron for First Quarter—Steel Plant Operations at High Rate

BIRMINGHAM, Dec. 4.—One merchant producer continues to quote $17 on No. 2 foundry, while others are taking business at $16.50 except small orders. There has been heavy buying during the past 10 days. Practically all of the larger melters have covered their requirements through March and several of the smaller consumers have contracted for most of their first quarter requirements. Some iron is being sold outside the district. Shipments are holding up well; no iron was stocked during November. The Woodward Iron Co. changed its No. 2 Woodward furnace from foundry to basic on Nov. 21. The furnace of the Gulf States Steel Co. at Alabama City was changed from foundry to basic on Dec. 1. On Nov. 26, the Tennessee company changed its Ensley furnaces Nos. 1, 3 and 6 from foundry to basic and furnace No. 4 from basic to foundry. Of the 19 furnaces in blast, 10 are on foundry, seven on basic, one on ferromanganese and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$16.50 to $17.00
No. 1 fdy., 2.25 to 2.75 sil.	17.00 to 17.50
Basic	16.50

Finished Steel.—Prices are becoming firmer, following the advance of $2 a ton on bars, plates, shapes and sheets reported last week. Mills are holding closely to quotations of 2.25c. on bars, plates and shapes. Sheets continue strong. New business in November was slightly ahead of October bookings in all of the more important lines. Inquiries indicate an active market for the next two or three weeks. Plant operations are at a higher rate than at any time in recent years. The Tennessee company has increased its active open hearths at Ensley from five to eight. Seven are active at Fairfield and the Gulf States Steel Co. is working four at Alabama City. Structural steel fabricators are operating on good schedules with satisfactory tonnage pending. The Ingalls Iron Works Co. has booked an order for 750 tons for the American Smelting & Refining Co. at Rosita, Mexico.

Buffalo

Pig Iron Demand Not Heavy but Prices are Maintained—Steel Mills Operating at Undiminished Rate

BUFFALO, Dec. 6.—Pig iron inquiries and orders the past week have not been heavy, but apparently prices are being maintained in the district. One inquiry from New Jersey is for 1000 tons of foundry and a New England inquiry is for 2000 tons. Two other inquiries from New England for foundry are for 500 and 1000 tons. More purchasing is expected for the first quarter. Shipments from Buffalo furnaces are heavy. Preparations are being made to blow in another Hanna stack. The Bethlehem Steel Co. is now operating six blast furnaces here, the highest number in months. This year has brought a large increase in pig iron shipments on the New York State barge canal. Actual figures will not be available until next week, but the total probably is over 130,000 tons.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.00 to $18.50
No. 2X fdy., sil. 2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25	18.50 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations at Buffalo mills continue at an undiminished rate. Specifications are satisfactory notwithstanding that the inventory period is close at hand. Prices are firm on the major rolled products, with 2c., Buffalo, quoted on bars, shapes and plates for volume purchasing and 2.10c. for small lots. Specifications from the drop forging industry indicate that this business is maintaining heavy operations. Sheet business is very good, and the prices of 2.85c. for black and 4.10c. for automobile body for first quarter delivery are firm. Reinforcing bars are in light demand, and no important structural contracts have been let. Warehouse business shows no decline.

Old Material.—New purchases are small, but all dealers have orders to fill. An active market exists for cast iron borings for blast furnace consumption at $11 to $11.50. Some lots of this material are going into Pittsburgh and Youngstown districts. A few sales of knuckles and couplers and rolled steel wheels have been made at $17.50, and some lots of No. 1 cast have brought $15.75. Dealers are anticipating a better demand for specialties because steel castings business continues to show an upward trend. One steel plant is still regulating shipments of scrap, but the restrictions are not as severe as they have been in the past. A recent purchase of No. 2 heavy melting steel made at $13.25 establishes a lower figure and a wider spread for this material.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.50 to $16.50
No. 2 heavy melting steel	13.25 to 14.00
Scrap rails	15.50 to 16.00
Hydraul. comp. sheets	13.50 to 14.00
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	13.00 to 13.75
No. 1 busheling	14.50 to 15.50
Hvy. steel axle turnings	13.50 to 14.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	12.50 to 13.00
Acid Open-Hearth Grades	
Knuckles and couplers	17.50 to 18.00
Coil and leaf springs	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	15.50 to 16.00
Stove plate	14.50 to 14.75
Locomotive grate bars	13.00 to 13.50
Steel rails, 3 ft. and under	17.50 to 18.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Canada

Advances of 50c. to $1 a Ton on Pig Iron Expected to Go Into Effect Soon

TORONTO, ONT., Dec. 4.—While the general trend of business in the Canadian pig iron markets showed very little change during the week, there is still unsettlement with regard to the general price situation. With foundry pig iron selling in Buffalo at $18 to $19, Canadian producers have an advantage of 60c. to $1 per ton in the Toronto market over their Buffalo competitors. Canadian prices, however, are deemed too low by local blast furnace representatives, and there has been considerable discussion of the situation of late. It is pretty well settled that advances of from 50c. to $1 per ton will go into effect here for first quarter delivery. Shading has disappeared; melters who were quoting 50c. under the general market have come up to the current quotation. The demand for foundry and malleable iron continues to expand.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Building trades have not yet been affected by winter weather, and construction work is proceeding at an undiminished rate. Most of the contracts placed during the week involved small tonnages, but fabricators are figuring on several contracts for from 1000 to 10,000 tons. Approximately 3000 tons of steel will be required for the Canadian National Railways hotel at Vancouver, B. C. Contracts awarded included 250 tons to the Disher Steel Construction Co., Toronto, for factory at New Toronto, Ont., for Ritchie Cut Stone Co.; 75 tons to Standard Steel Construction Co., Welland, Ont., for addition to plant of Grouts, Ltd., at St. Catharines, Ont.; 150 tons to Hamilton Bridge Co., Hamilton, Ont., for addition to building for Hamilton Bakeries, Ltd., Hamilton.

Old Material.—The demand for iron and steel scrap is active, but sales are being held up in some districts because of difficulty in reaching price agreements. Mills are taking in large tonnages and foundries and other consumers are also buying freely. Prices are firm but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.50	$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	....	16.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Boston

Pig Iron Sales Extend Into April—Week's Business About 7000 Tons—Scrap Steady

BOSTON, Dec. 4.—Pig iron sales in this territory the past week totaled about 7000 tons, mostly Mystic, Champlain and Buffalo iron, for shipment extending into April. They included a round tonnage to a Worcester, Mass., foundry; 1000 tons No. 1X to another Massachusetts melter, 1000 tons No. 2X and No. 1X to a Providence, R. I., plant and numerous smaller lots. In addition, the Mystic Iron Works sold 1000 tons No. 2X outside of New England at the equivalent of $18.50 a ton, on cars Buffalo. On large tonnages, buyers claim they can still buy No. 2X Buffalo iron at $18 a ton, furnace. The most active Buffalo stack, however, is holding at $18.50, and other New York State and Mystic irons are on an equivalent delivered basis. Buffalo iron for rail and water shipment has been withdrawn from the market. Small lots of charcoal iron were sold the past week at $24 a ton, base furnace.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25		$22.91
*Buffalo, sil. 2.25 to 2.75		23.41
East. Penn., sil. 1.75 to 2.25	$24.15 to	24.65
East. Penn., sil. 2.25 to 2.75	24.65 to	25.15
Va., sil. 1.75 to 2.25		26.91
Va., sil. 2.25 to 2.75		27.41
Ala., sil. 1.75 to 2.25	23.41 to	25.77
Ala., sil. 2.25 to 2.75	23.91 to	26.27

Freight rates: $4.91 all rail from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.

Warehouse Business. — Hexagon poultry netting and wire cloth have been advanced 5 per cent for 1929 delivery. Advances in sheets made outside New England have not been followed here. The movement of all warehouse products out of stock is increasing, although slowly.

Iron Imports.—Imports of pig iron at Boston during November were 2304 tons, consisting of 1423 tons of Dutch and 881 tons of Indian. October importations were 420 tons.

Coke.—New England producers of by-product foundry coke have announced that December shipments on contracts will be made at $11 a ton, delivered within a $3.10 freight rate zone. That quotation has been in effect since April, last, when the price to foundries was reduced from $11.50. Higher foundry coke prices in the first half of 1929 appear unlikely owing to the policy of one oven to make a flat $11 price instead of the customary sliding scale contract. All ovens are now caught up on contract specifications. Domestic coke is in heavy demand.

Old Material.—Aside from a firmer market for steel turnings and an easier market in forge scrap, old material prices are unchanged. The firmness of steel turnings is due to buying against Pennsylvania mill contracts, while the weakness of forge scrap is attributed to the completion of orders for a Worcester, Mass., user. New England foundries in general are using more scrap than a year ago, but are supplying needs from local or nearby yards from which material can be trucked. The export market for No. 1 and No. 2 steel, mostly automobile, is still $10.50 a ton, on dock. It is expected that 3500 tons will be cleared this week.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $11.00
Scrap T rails	10.50 to 11.00
Scrap girder rails	10.00 to 10.25
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.25 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	9.00 to 9.25
Forge flashings	9.50 to 9.75
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	6.00 to 6.50
Shafting	14.50 to 14.75
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to 10.00
Rails for rolling	11.00 to 11.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Railroad malleable	15.50 to 15.75

Germany Greatly Increases Machinery Exports

WASHINGTON, Dec. 4.—Surpassed only by the United States, Germany now ranks second among machinery exporting countries of the world, according to W. H. Rastall, chief Industrial Machinery Division, Department of Commerce. Record shipments are being made by the German industry, whose exports for the first nine months of the current year may bring the year's total to a figure equal to or more than pre-war exportation. Total exports for the nine months were 397,837 tons, valued at $162,710,604, against 318,564 tons, valued at $125,954,122 in the corresponding period of 1927. These figures include machines shipped as reparation deliveries in kind.

Detroit

Employment Declining in Automobile Industry, but Increased Schedules Are Expected After Jan. 1

DETROIT, Dec. 4.—Industrial operations in this district have slowed down, as is usually the case just prior to inventory period. The employment barometer of the Employers' Association shows a consistent drop of about 2500 persons a week. The present employment figure is 274,397—2555 less than a week ago, but 78,504 greater than the figure of a year ago.

The Chevrolet Motor Co. is planning for a production of 1,250,000 cars in 1929. Shipments to dealers are to begin Dec. 15, with a December production of approximately 42,000 cars. The January schedule is estimated at 106,000 cars.

The Auburn Automobile Co. has released certain material orders to cover the first five months of 1929 on the basis of 16,000 units.

The Oakland Motor Car Co. is expected to announce a new line of Pontiacs, larger and more luxurious than the old line. The present construction operations at Pontiac, which will be completed about the first of the year, will increase the capacity of the Oakland-Pontiac plant to about 350,000 cars for 1929. About 3000 additional employees will be required.

The steel work on section 5 of the Detroit-Windsor tunnel, which includes the customs building and Detroit approach, will be out for figures in about a week. About 800 tons will be required. In the near future figures will be taken on the following: Union Trust Co. Building, Flint, Mich., 1500 tons; also a building for the Detroit Gear & Machine Co. The Flint Auditorium, Flint, Mich., 900 tons, was awarded to the Flint Structural Steel Co.

Indications are that shipments of pig iron will be slightly below those of November owing to inventory and holiday periods. Most melters are covered for their first quarter requirements. Furnaces serving the district will have lowest yard stocks on Jan. 1 of any time in the past five years.

There have been no changes in quotations on old material in this district during the past week.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.00 to $13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling	11.00 to 11.50
Sheet clippings	8.00 to 8.50
Flashings	11.50 to 12.00

Pacific Coast

San Francisco Hotel Takes 2870 Tons of Steel—Prices on a Firmer Basis

SAN FRANCISCO, Dec. 1 (*By Air Mail*).—Demand for iron and steel products on the Pacific Coast during the week eased off, especially as regards large awards. Featuring the market was the letting of 2870 tons of fabricated steel for a hotel in San Francisco for the Methodist Book Concern to the McClintic-Marshall Co. This is the largest structural award placed in this district since May. Prices, generally, seem to be on a firmer basis.

Pig Iron.—Few inquiries or sales involving large lots of foundry pig iron were reported this week. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars this week were the lightest since the early part of June. Only one project in excess of 100 tons was reported. This was 300 tons for a bridge over Mission Bay, San Diego, secured by an unnamed interest. H. E. Doering, Portland, was awarded the general contract for a school in that city involving 400 tons and is expected to award a sub-contract for the bars next week. Bids will be opened Dec. 18 on 209 tons for a bridge at Tacoma, Wash. Little or no improvement is noted in out-of-stock prices. In Los Angeles and San Francisco, 1.80c. base, continues to prevail. On merchant bar steel, 2.30c., c.i.f. Coast ports, is being firmly maintained.

Plates.—The Western Pipe & Steel Co. was awarded a pipe line at La Habra, Cal., taking 100 tons. The only inquiry of size in the market is for 125 tons of 18-in. pipe for Vancouver, B. C. No change in prices is noted; 2.25c., c.i.f., is the minimum, with

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	5.00c.
Blue ann'l'd sheets (No. 10)	4.00c.
Galv. sheets (No. 24)	5.40c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$2.40
Cement c't'd nails, 100 lb. keg	3.40

2.30c., c.i.f., applying on some of the smaller lots.

Shapes.—In addition to the 2870 tons for a hotel in San Francisco, mentioned above, 570 tons for a bridge at Paradise, Mont., was placed with an unnamed fabricator. Other awards involved lots of less than 100 tons each. A fair tonnage of pending business is before fabricators. Domestic plain shapes remain firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe awards this week were limited. Lewiston, Idaho, placed 109 tons of 2 to 8-in. Class B pipe with an unnamed company. The American Cast Iron Pipe Co. took 776 tons of 18-in. Classes C and D pipe for the Marin Municipal Water District at San Rafael, Cal., and the Pacific States Cast Iron Pipe Co. secured 90 tons of 6-in. Class C pipe for the same company. Bids have been opened on 292 tons of 4 to 8-in. Class C pipe for Friday Harbor, Wash. Seattle has taken bids on the improvement of West Holden Street, calling for 220 tons of 8 and 12-in. Classes B and C pipe. The largest pending business calls for 548 tons for the improvement of Arlington Street, Los Angeles, bids on which go in Dec. 3.

Establishments engaged primarily in the manufacture of aluminum products reported an output valued at $123,557,112 in 1927, according to the Bureau of the Census. This represented a decrease of 3.3 per cent, compared with $127,830,756 in 1925. The 1927 production included $27,990,354 for aluminum ware, principally cooking utensils and household articles; $27,080,382 for castings, including motor vehicle accessories and parts; $62,370,107 for all other aluminum products, including bars, plates, sheets and wire; and $6,116,269 miscellaneous.

New Trade Publications

Pumping Equipment. — Worthington Pump & Machinery Corporation, 2 Park Avenue, New York. Bulletin WP-1003 devoted to general information regarding Worthington pumping apparatus used in mechanical equipment of buildings. Included are steam and electrical pumps for heating systems, vacuum pumps, wells, sump pumps and pumps for fire protection, elevators and lifts, ventilating systems, cold water meters, refrigerators for buildings and compressed air for buildings.

Steel Buildings. — Blaw-Knox Co., Pittsburgh. Bulletin 1057 dealing with Blaw-Knox standard buildings of copper-bearing galvanized steel. Booklet is generously illustrated and provides complete descriptions of all types of buildings provided, as well as construction details of steel sash, doors and windows, roofing materials and other products furnished.

Heating Specialties.—Vapor Heating Co., York, Pa. Bulletins B-141, B-145 and B-146, illustrating and describing new Broomell sliding sleeve modulating valve, Broomell vapor-pressure system and Broomell damper regulator and compound vacuum-pressure gage respectively.

Electrical Equipment. — Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2119 devoted to Obround condulets, form 7, covers, wiring devices, reducers and branch extensions, with illustrations and full specifications, Bulletin 2122 describing types F and LB condulets.

Industrial Lanterns; Sanding Equipment.—Nichols-Lintern Co., 7960 Lorain Avenue, Cleveland. Booklet devoted largely to company's Universal signal lanterns, flasher controls and reflector units for steel mill, factory and highway use. Booklet also contains detailed description of Lintern electro-magnetic sander for overhead cranes and of N-L mechanical sanders for locomotive cranes.

Ventilating Equipment.—E. I. Du Pont de Nemours & Co., Inc., Fairfield, Conn. "Auxiliary Ventilation for Metal Mines," booklet dealing with ventilation in operation of metal mines and use of Ventube, flexible tubing for this purpose. Numerous photographs of working installations are included, as well as diagrams and charts.

Refining Iron. — Mathieson Alkali Work, Inc., New York. Bulletin No. 285, "Refining Iron with Purite," describes the use and effect of this chemical on cast iron in removing sulphur together with a discussion of other advantages claimed. Its eight pages are well illustrated.

Crushers.—Pennsylvania Crusher Co., Broad and Arch Streets, Philadelphia. Bulletins 2003 and 2004 of 16 and four pages respectively illustrate and describe the Penn-Lehigh and Pennsteel crushers, designed for heavy work on rock, coal, limestone, gypsum and other materials. The Penn-Lehigh type consists of single-roll crushers with rolls 30 and 36 in. in diameter and 48 to 72 in. long. The Pennsteel crusher also is of the single-roll type, but with rolls 21 and 24 in. in diameter and varying from 40 to 60 in. in length.

Temperature Control. — Weaver Brothers Co., Clinton, Mich. Folder 555, two pages, illustrates and describes a Foxboro pickling tank temperature controller for standardized work and uniform results.

Portable Belt Conveyors.—Atlas Engineering Co., Milwaukee. Bulletin 26-B of 16 pages illustrates and describes a line of portable conveyors for loading and unloading purposes, or handling of materials in places where conveyors are not regularly installed. Stacker conveyors are included.

Motor Control.—Cutler-Hammer Mfg. Co., Milwaukee. 4-page folder tendering engineering advice to those who encounter what seem to be difficult problems in motor control.

Rotating Base Aids in Painting

In painting metal drums at the Paraffine Companies, Inc., San Francisco, plant, the drums are placed on a revolving base. The drum is slowly turned, bringing the unpainted areas to within easy reach of the painter and doubling the output as compared with the ordinary method.

Non-Ferrous Metal Markets

Copper Steady and Quiet, Tin Moderately Active and Firm, Lead Advanced, Zinc Sales Large With Price Firm

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Dec. 4	Dec. 3	Dec. 1	Nov. 30	Nov. 28
Lake copper, New York	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y.*	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y.	52.50	53.25	....	53.00	52.75
Lead, New York	6.50	6.50	6.35	6.35	6.35
Lead, St. Louis	6.32½	6.30	6.25	6.22½	6.22½
Zinc, New York	6.70	6.70	6.70	6.70	6.70
Zinc, St. Louis	6.35	6.35	6.35	6.35	6.35

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Dec. 4.

Copper.—Domestic buying continues in moderate volume with February delivery predominant. Some fill-in requirements are also noted for intermediate positions. Foreign consumers have been more active, particularly Germany, and sales last week were larger than recent previous ones. Total sales to all consumers in November were large, but less than for some months and are estimated at 80,000 to 85,000 tons. Quotations continue firm and unchanged at 16c., delivered in the Connecticut Valley, for electrolytic copper and at 16.25c., c.i.f. European ports. Lake copper is quiet but firm at 16c. to 16.12½c. delivered, with sales made for February-March.

Copper Averages.—The average price for Lake copper for November, based on daily quotations in THE IRON AGE, was 16.12½c., New York. The average price of electrolytic copper was 15.75c., refinery, or 16c., delivered in the Connecticut Valley.

Tin.—Except for the opening of the National Metal Exchange in New York Monday, there have been no features of interest in the market. Activity both here and abroad was held back because of the new development. The new exchange deals exclusively in standard tin, which is similar to the same designation on the London exchange and which makes possible dealings in this country in futures, both on the long and short side, or so-called "hedging." The exchange opened auspiciously with sales of 650 tons and with fair activity today at 385 tons. For the week ended Dec. 1, total sales in New York were only 600 tons. Consumers have been showing no interest and dealers were not inclined to operate actively. Yesterday, after the close of the new exchange, 200 tons of Straits tin was reported sold. Today, the market has been quiet, with spot Straits tin quoted at 52.50c., New York. London prices today, which were down sharply from yesterday, were close to those of a week ago, with spot standard quoted at £239, future standard at £237 5s. and spot Straits at £239 2s. 6d. The Singapore market today was £242. Deliveries of tin during November were 7145 tons, with 3603 tons in stock and landing on Nov. 30.

Lead.—Yesterday the American Smelting & Refining Co. advanced its contract price from 6.35c. to 6.50c.,

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.75c. to 54.75c.
Tin, bar	55.75c. to 56.75c.
Copper, Lake	17.00c.
Copper, electrolytic	16.75c.
Copper, casting	16.00c.
Zinc, slab	7.50c. to 8.00c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	12.25c. to 13.25c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingot, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½	34.00c. to 35.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	58.50c.
Tin, bar	60.50c.
Copper, Lake	17.00c.
Copper, electrolytic	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig	7.00c. to 7.25c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	62.50c.
Solder, ½ and ½	35.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	28.25c.
Brass Rods	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass and copper products have not changed since the advances of Oct. 29. Zinc sheets have been quoted at 9.75c., base, since July 30, and lead full sheets at 10.25c. to 10.50c. since Nov. 15.

List Prices, per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Zinc	9.75c.
Lead (full sheets)	10.25c. to 10.50c.
Seamless Tubes—	
High brass	25.37½c.
Copper	26.37½c.
Rods—	
High brass	18.25c.
Naval brass	20.25c.
Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls	24.00c.
Brazed Brass Tubing	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.50c.	11.50c.
No. 1 yel. brass turnings	9.25c.	9.875c.
No. 1 red brass or compos. turnings	9.50c.	10.50c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	13.00c.	15.00c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	20.50c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	27.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	26.87½c.
Copper	27.87½c.
Brass Rods	18.25c.
Brazed Brass Tubes	28.50c.

New York. This advance had been foreshadowed by a steadily rising market at St. Louis, which yesterday was 6.30c. and today is 6.32½c. to 6.35c. Sales, which have been heavy for some time, have continued in good volume, with practically all consuming lines represented. Deliveries extend into January.

Zinc.—Buying by both consumers and dealers continues brisk, and prices are very firm for prime Western zinc at 6.35c., East St. Louis, or 6.70c., New York. The heavy buying of recent weeks was reflected last week in the ore market, where over 22,300 tons was reported sold, about double the recent normal quantity. Production was estimated at about 12,000 tons, which is relatively low, and shipments were close to 15,000 tons, the largest week in many months. Ore stocks have been substantially reduced, being estimated now at about 51,000 tons. The feature is the fact that ore still stands at $40.

Antimony.—The market for Chinese metal is quiet at 10c., duty paid, New York, for all positions.

Nickel.—Wholesale lots of ingot nickel for this year's delivery are quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb. The International Nickel Co. announces that electrolytic nickel cathodes, 99.95 per cent, are included for next year's delivery at the same prices as charged for ingot and shot nickel during 1928. Prices on the latter form remain unchanged for 1929.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Markets at Chicago

CHICAGO, Dec. 4.—Both forward buying and spot sales are quiet. Prices for tin and lead are advanced. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper, 16.50c.; tin, 54c.; lead, 6.40c.; zinc, 6.45c.; in less-than-carload lots: antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

New Circuit Breaker for Small Installations

A new oil circuit breaker, type FK-33, has been announced by the General Electric Co. for manual or electric operation. The devices are rated 4500 volts, 200 and 400 amperes, and are 2, 3 and 4-poles, single and double-throw. The circuit breaker is recommended for use in small plant and industrial installations.

The American Road Builders' Association will hold its annual convention and road show at the Cleveland Auditorium, Jan. 14 to 18, 1929.

Railroad Equipment

Atchison Inquires for 3400 Freight Cars

INQUIRY from the Atchison, Topeka & Santa Fe for 3400 miscellaneous freight cars, in addition to 1075 on which bids were asked last week, is the feature of the market. An oil company has ordered 200 tank cars, but outside of this purchases were negligible. The Louisville & Nashville has come into the market for 24 locomotives. Details of the week's business follow:

Richardson Refining Co. has ordered 200 tank cars from General American Tank Car Corporation.

New York Central has given contract for rebuilding 50 70-ft. steel underframe coaches to American Car & Foundry Co.

Boston & Maine is inquiring for 10 baggage and mail cars.

Chicago, South Shore & South Bend has purchased two caboose cars from American Car & Foundry Co.

Lehigh Valley is inquiring for two gas-electric rail motor cars and four trailer cars.

Warner Quinlan Co., New York, has ordered 10 10,000-gal. insulated tank cars from General American Tank Car Corporation.

Mukden-Hailung, Mukden, Manchuria, has ordered steel parts for 60 steel underframe high-side gondola cars and 40 steel underframe box cars from Pressed Steel Car Co.

Chesapeake & Ohio has ordered two dining cars from Pullman Car & Mfg. Corporation.

Atchison, Topeka & Santa Fe is in market for 2000 box cars, 400 50-ton gondola cars, 250 70-ton gondola cars, 100 hopper cars, 150 sulphur cars, 500 refrigerator cars, 10 chair smoking cars, 10 mail and baggage cars, 10 chair cars and 10 Jim Crow cars. All of these are in addition to cars inquired for last week.

Louisville & Nashville is in market for 24 Mikado type locomotives.

Reinforcing Steel

Commercial Building Will Take 2500 Tons

A RAILROAD commercial building at Philadelphia, calling for 2500 tons, accounted for a large part of the 3100 tons of reinforcing steel required for projects brought out in the last week. The following awards took less than 600 tons:

OAK PARK, ILL., 150 tons, store, to Olney J. Dean & Co.

OAK PARK, 120 tons of rail steel bars, apartment building, to Calumet Steel Co.

SAN DIEGO, CAL., 300 tons, Mission Bay causeway, to unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PHILADELPHIA, 2500 tons, reinforcing bars for Reading Commercial Building; bids originally taken for all structural steel.

CLEVELAND, 200 tons, Robert Fulton and Louis Agassiz schools.

TACOMA, WASH., 209 tons, bridge on Tacoma Avenue; bids Dec. 18.

SACRAMENTO, CAL., 188 tons, bridge at Benham; Paul White, Santa Monica, low on general contract.

Steel Castings With a Stainless Coating

A NEW product among stainless steel materials has been developed by the Bethlehem Steel Co., Bethlehem, Pa. It is offered under the name of "Stainless-Clad Steel Castings," and it is claimed that this new development in foundry work imparts many desirable and important qualities to castings in an economical and practical manner.

Bethlehem stainless-clad castings are steel castings with a coating of ferrochromium made by a patented process. Either carbon steel or alloy steel is used as the base metal of the casting, depending upon the requirements of the service for which it is intended.

The coating is an integral part of the casting, as shown by the illustration, and can be put on those surfaces that require heat resistance, acid resistance or exceptional wearing qualities. The stainless coating is pointed to as thoroughly amalgamated with base metal so that it cannot be chipped, pounded off or separated by any mechanical means.

It is described as hard and tough, especially durable under conditions where service with extreme heat and resistance to all organic and most inorganic acids is desired. Other alloy elements or metals can be used in the coating so as to produce castings having properties to meet different service conditions. It is also stated that the economy of using such castings is considerable because of the low cost of service per hour.

Cross Section of a Stainless-Clad Steel Casting Etched to Show the Coating

PERSONAL

W. J. JACK has been named manager of the strip steel division Republic Iron & Steel Co., Youngstown, taking the place of F. H. LOOMIS, recently advanced to assistant general manager of sales of the company. Mr. Jack was with the Trumbull Steel Co. for 11 years prior to its absorption this year by the Republic company, and also had experience in the manufacture and sale of strip steel with the West Leechburg Steel Co.

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MAJ. ARTHUR A. WEDDERSPOON has resigned as Indiana district sales agent General Refractories Co., Philadelphia, to accept a position in London. He was in the Pittsburgh office of the company for about two years prior to the establishment of the Indiana district sales office at Indianapolis on Jan. 1, 1926. He served with the British forces during the World War. The company has closed its Indianapolis office and Indiana district sales hereafter will be handled from the Cleveland office. HOMER C. WALLACE has been transferred from the Philadelphia to the Cleveland office of the company.

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DR. EDWARD E. MARBAKER, industrial fellow in the Mellon Institute of Industrial Research, Pittsburgh, will speak before the Chicago Foundrymen's Club, Thursday evening, Dec. 6, on the subject of "Cast Iron: Its Manufacture."

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M. F. TIGHE again has been elected president of the Amalgamated Association of Iron, Steel and Tin Workers and now enters upon his tenth term as head of that organization. DAVID J. DAVIS has been reelected secretary-treasurer, LOUIS LEONARD assistant secretary, and BEN I. DAVIS, managing editor of the *Amalgamated Journal*, official organ of the association. JACOB S. MCGINLEY continues as vice-president of the boiling and finishing division, and EDWARD W. MILLER is vice-president of the sheet and tin plate division.

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GRANT B. SHIPLEY, recently appointed a member of the National Committee on Wood Utilization, is president of the Century Wood Preserving Co., Pittsburgh, and of the American Mond Nickel Co.

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GEORGE W. DENYVEN retired Dec. 1 as New England sales representative of the Champion Rivet Co., Cleveland, and was succeeded by HENRY J. LINN, who has been his assistant. The company's office is at 250 Stuart Street, Boston.

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W. B. MARSHALL has been appointed sales manager of the contract engineering department, Chain Belt Co., Milwaukee. He has been associated with the company since 1921, when he was graduated from the Sheffield Scientific School of Yale University. He began as a student apprentice and after several years' work in the shops and foundries he was made secretary to the general manager and later spent some time in the Chicago office. In 1926 he returned to Milwaukee and was engaged in contract engineering sales work until his recent appointment.

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VERYL PRESTON, for some years president of the Eastern Steel Co., has become associated with the New York Stock Exchange house of McClure, Jones & Co., 115 Broadway, New York.

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C. E. GEORGE, for many years Western manager of the American Schaeffer & Budenberg Corporation, Brooklyn, has joined the Chicago sales staff of the Taylor Instrument Companies, Rochester, N. Y., with headquarters at 58 East Washington Street.

—

DR. V. N. KRIVOBOK, associate professor of metallurgy at the Carnegie Institute of Technology, Pittsburgh, will speak on "Recent Developments in the Study of Iron-Manganese Alloys of Purity," at a meeting of the Cincinnati chapter of the American Society for Steel Treating, to be held at the Engineers' Club on Thursday evening, Dec. 6.

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ARTHUR L. COLLINS, since 1922 sales metallurgist for Horace T. Potts & Co., Philadelphia, has been made manager of the company's tool and alloy steel division. He is a graduate of the Stevens Institute of Technology, Hoboken, N. J., and is at present on the lecture staff in the metallurgical department of Temple University, Philadelphia.

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EUGENE W. SMITH, general foundry superintendent for the Crane Co., Chicago, spoke before the Wisconsin Gray Iron Foundry Group in Milwaukee on Dec. 5. His subject was "Molding Sand Control in the Foundry and the Use of Artificial Binders as Substitutes for Natural Bond in Molding Sand."

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HORACE C. KNERR, consulting metallurgical engineer, Philadelphia, will address the Boston chapter of the American Society for Steel Treating at a meeting to be held at the West Lynn, Mass., plant of the General Electric Co. on Friday evening, Dec. 7. In a paper entitled "Duralumin and Other Aluminum Alloys," he will discuss the use of non-ferrous alloys and other metals in the manufacture of aircraft.

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J. T. GAFFNEY, for four years foundry and pattern shop manager for the Toledo Machine & Tool Co., Toledo, Ohio, has resigned. He has announced no new connection and is at present located at 2723 Monroe Street, Toledo.

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GEORGE E. JOHNSON, New York representative for the Saginaw Stamping & Tool Co., Saginaw, Mich., has been appointed general sales manager for that company. Manning, Maxwell & Moore, Inc., 100 East Forty-second Street, New York, has been appointed exclusive distributer in the New York territory.

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HARRISON J. BEHR, for the last seven years associated with the Mechanical Rubber Co., Cleveland, division of the United States Rubber Co., has joined the sales organization of the Boston Woven Hose & Rubber Co., Boston, as special field representative. Before going with the Mechanical company, he was identified for 12 years with the B. F. Goodrich Rubber Co., Akron, Ohio.

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E. D. GIBERSON, president E. D. Giberson & Co., 40 Rector Street, New York, agents in the eastern United States of Ferrostahl G.m.b.H., will leave Dec. 10, for a six weeks' trip in Germany, France, Belgium and Austria. He will be the guest during the holidays of ERNST DAMM, of Dusseldorf, vice-president in charge of European plants of the Yale & Towne Mfg. Co., Stamford, Conn.

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BENEDICT CROWELL, chairman of the board of the Crowell & Little Construction Co., Cleveland, has been made a director of the Chamber of Commerce of the United States, succeeding R. P. LAMONT, president American Steel Foundries, Chicago, who has been made vice-president for the Northern Central Division.

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ALVAN MACAULEY, president Packard Motor Car Co., Detroit, who was recently elected president of the National Automobile Chamber of Commerce, was the guest of honor at a recent dinner given on his eighteenth anniversary with the company.

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ABRAM F. MYERS assumed office Dec. 1 as chairman of the Federal Trade Commission, succeeding WILLIAM E. HUMPHREY, who, following the rules of rotation of the commission, served one year.

The annual meeting of the Power Transmission Association will be held at the Hotel Commodore, New York, Thursday, Dec. 6. The association's booth at the Power Show, held in New York Dec. 3-8, is No. 646.

OBITUARY

CHARLES SEITZ, resident manager of the Addyston, Ohio, plant of the United States Cast Iron Pipe & Foundry Co., was killed in an automobile accident Dec. 1. He was 53 years of age and had been in the company's employ for more than 20 years. His first assignment was at Addyston and later he was appointed superintendent of the Scottdale, Pa., plant. About a year ago he returned to Addyston as resident manager.

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WILLIAM L. RODGERS, founder and president of the Pittsburgh Gage & Supply Co., Pittsburgh, died at his home in that city Dec. 2. He had been in poor health for some time. He also was the founder and head of the Gainaday Electric Co., manufacturer of electric washing machines and other household electrical appliances.

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ALMOS D. NEELD, who was noted for his table of safe loads and stresses for plate girder bridges and for steel roof trusses, and was prominent in construction engineering for almost 50 years, died at his home in Crafton, Pa., Nov. 28. He was born in Pittsburgh Feb. 15, 1858, and was graduated in 1875 from the Western University of Pennsylvania, now the University of Pittsburgh.

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RALPH H. BOURNE, who resigned as senior vice-president of the Whiting Corporation, Harvey, Ill., in November, 1927, died Nov. 27, at Wareham, Mass. He was graduated in mechanical engineering from Cornell University in 1905 and for a time was employed by the Wellman-Seaver-Morgan Co., Cleveland, and later by the Hoover & Mason Co., Chicago. In 1907 he became associated with the Whiting Foundry Equipment Co., now the Whiting Corporation.

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VAN LOAN WHITEHEAD, chairman of the board of the Whitehead Brothers Co., Buffalo, maker of foundry supplies and equipment, died in that city on Nov. 10 as the result of injuries sustained the day before when he was run down by an automobile. He was born in 1857 and had been associated with the foundry industry for many years.

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BERTRAND G. MACKEY, for 18 years purchasing agent for Goulds Pumps, Inc., Seneca Falls, N. Y., died at his home in that city on Nov. 26, following a long illness. He was born at Locke, N. Y., in 1875 and went with the Gould company in 1906 as assistant purchasing agent. He was made purchasing agent in 1908 and held that position until 1926 when he resigned on account of ill health.

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GEORGE M. STEDMAN, for many years president of the Stedman Foundry & Machine Works, Aurora, Ind., died at Columbia Hospital, Milwaukee, on Nov. 27 after a long illness, aged 62 years. He had retired four years ago because of failing health and recently had made his home in Milwaukee.

New 42 and 48-In. All-Geared Motor Driven Lathe

(*Concluded from page* 1437)

lever on the carriage. There are also knobs on the carriage for engaging the power longitudinal feed and the cross feed, plain or angular, as well as a lever for engaging the half nuts with the lead-screw. The reverse handle for the feeds, and the rapid traverse lever, which controls the motor for traversing the tool carriage in either direction, is also located on the carriage. An automatic stop is provided for the carriage. A chasing dial, which can be swung into an inoperative position when the lathe is not being used for chasing threads is also furnished.

Lead screw and rod hangers are furnished to carry the weight of the lead screw and feed rod. These hangers are engaged and released by hooks attached to both sides of the carriage in such a way that they are pushed or pulled along the outer bed vee and automatically locate themselves at fixed intervals. The tailstock arrangement includes a handwheel that permits the operator to center work or perform boring operations with minimum effort.

The bed of the machine is of deep girder planer type. The compound rest is of new design. Taper attachment, with taper-turning capacity of 6½ in. per ft. for the full distance between centers can be supplied. A steadyrest with 18½ in. opening and screw adjustable jaws is regular equipment. Follow and full swing rests, extra gears and index plates are available as extras.

A course of lectures on cost reduction is to be given by Dr. Robert Grimshaw on Thursday evenings beginning Feb. 9 at the College of the City of New York. The course is intended for manufacturers and business men as well as students and the fee is $10. For information one may address Walter Stalb, Bursar, 140th Street and Convent Avenue, New York.

Plan Large Brass and Copper Merger

Directors of the Rome Brass & Copper Co., Rome, N. Y., have approved a plan to merge with six other companies to form the General Brass Corporation. Companies to be included are the Taunton-New Bedford Copper Co., Taunton and New Bedford, Mass.; the Baltimore sheet mill of the General Cable Corporation; the Rome Mfg. Co., Rome, N. Y.; the Michigan Brass & Copper Co. and the Higgens Brass & Mfg. Co., Detroit, and the Dallas Brass & Copper Co., Chicago. The merger is expected to bring about 20 per cent of the country's brass and copper business under one control. Factories of the constituent companies will continue to operate with unchanged management and each organization will be represented on the executive committee of the new corporation.

Cincinnati Car Co. Absorbs Versare Corporation

Directors of Cincinnati Car Co., Cincinnati, have approved terms of merger with the Versare Corporation, Albany, N. Y., under which manufacturing operations will be centered in Cincinnati. The company will manufacture interurban and street cars, gasoline-powered industrial locomotives and a new type of automobile bus. The new company, to be known as the Cincinnati Car Corporation, will be headed by H. L. Sanders as president. O. F. Warhus, designing engineer of the Versare Corporation, will become vice-president. Randal MacDonald, treasurer of the Versare Corporation, will be assistant to the president.

Pontiac Foundry to Install $200,000 Conveyor System

The plant of the Wilson Foundry & Machine Co., Pontiac, Mich., will be shut down the week of Dec. 10 to permit the installation of a new $200,000 conveyor system. The conveyor, of the continuous chain type, is expected to carry about 2500 castings per day from the foundry to the cleaning department of the machine shop.

An export day, so called, Dec. 6, has been set apart by the Seventh National Exposition of Power and Mechanical Engineering to be held at Grand Central Palace, New York, Dec. 3 to 8. The export day program is to be marked by the assembling of the members of the various foreign departments of the exhibitors to answer questions peculiar to exporting. The foreign attendance last year, it appears, brought representatives from 33 foreign countries and five insular possessions of the United States.

Where Steel Exports Went in First Nine Months

Canada Took 436,056 Tons of Nine Leading Items—Japan Retains Second Position with 119,804 Tons, Followed by Argentina, 42,156 Tons; Brazil, 35,573 Tons; Mexico, 31,683 Tons; Chile, 29,165 Tons

Exports from United States, by Countries of Destination

(*In Gross Tons*)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	September		Nine Months Ended September		September		Nine Months Ended September		September		Nine Months Ended September	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	*10,989*	*9,780*	*109,562*	*103,726*	*8,701*	*10,454*	*112,699*	*122,440*	*12,038*	*7,184*	*140,568*	*125,874*
Canada	9,034	8,536	91,730	82,420	2,449	1,752	24,922	27,571	6,694	3,346	63,494	51,867
Japan	91	39	1,442	1,088	599	247	2,432	3,384	2,137	1,929	55,628	54,132
Cuba	56	102	894	567	254	724	4,230	9,532	33	50	1,622	840
Philippine Islands	170	417	1,974	1,705	531	1,635	17,066	14,005	326	149	2,374	1,988
Mexico	71	24	589	748	675	1,156	6,273	6,815	198	107	1,932	1,340
Argentina	....	....	....	....	370	717	5,418	6,913	29	88	1,221	1,467
Chile	....	....	....	....	....	....	....	....	1,483	831	1,786	3,110
Colombia	....	....	....	....	546	848	1,414	7,354	....	45	315	468

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	September		Nine Months Ended September		September		Nine Months Ended September		September		Nine Months Ended September	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	*16,466*	*11,897*	*161,130*	*137,076*	*4,634*	*4,763*	*54,097*	*38,609*	*3,069*	*4,011*	*33,902*	*25,838*
Canada	4,548	1,095	22,434	24,861	78	342	2,876	3,262	1,131	584	11,411	11,010
Japan	3,190	2,337	14,255	25,353	....	....	....	....	114	26	1,286	357
Cuba	....	1,249	2,396	14,751	462	495	3,868	3,131	67	131	798	1,047
Philippine Islands	202	1,684	3,332	4,411	118	570	1,534	1,633	11	....	219	509
Mexico	276	....	5,429	4,168	230	292	4,998	3,603	84	1,262	1,749	3,403
Argentina	....	....	....	....	1,636	710	11,830	4,383	889	1,387	7,361	4,325
Chile	121	300	21,613	3,332	....	....	....	....	55	....	....	....
Colombia	66	....	9,989	....	....	....	3,282	....	....	....	....	....
Brazil	....	960	18,290	17,641	392	762	11,474	6,633	51	43	911	153

	Tin Plate				Steel Bars				Heavy Plain Structural Material			
	September		Nine Months Ended September		September		Nine Months Ended September		September		Nine Months Ended September	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	*16,471*	*13,242*	*185,472*	*201,973*	*11,785*	*7,323*	*108,969*	*83,294*	*13,377*	*15,366*	*132,092*	*106,818*
Canada	4,344	2,963	38,107	35,225	9,392	3,875	71,737	48,513	10,661	11,451	109,345	87,176
Japan	6,888	4,593	42,403	40,692	82	5	808	670	31	4	1,550	2,426
Cuba	238	204	3,259	3,163	215	324	3,783	2,362	711	1,039	4,539	6,363
Mexico	761	668	9,335	9,330	63	....	574	....	127	....	804	....
Argentina	386	1,634	15,677	28,770	23	35	317	249	49	4	332	....
Chile	426	394	2,924	4,490	....	....	....	....	....	163	2,842	2,291
Brazil	227	....	4,898	....	....	....	....	....	....	....	....	....
China	798	1,307	13,475	5,838	....	....	....	....	....	....	....	....
British India	....	....	3,491	....	....	....	....	....	....	....	....	....
United Kingdom	....	....	....	....	1,042	915	12,957	14,228	....	....	....	....
Italy	....	40	3,950	12,161	....	....	....	....	....	....	....	....

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	September, 1928	January through September 1928	January through September 1927
North and Central America and West Indies	*138,310*	*1,026,898*	*827,072*
Canada and Newfoundland	126,131	857,288	632,474
Cuba	3,709	47,262	72,983
Mexico	5,593	61,140	64,164
Guatemala	121	6,418	5,356
Panama	626	11,649	14,992
Salvador	243	2,645	3,293
British West Indies	323	5,920	10,134
Other West Indies	323	22,785	14,037
Other Central America	741	11,791	9,639
South America	*20,942*	*323,325*	*269,623*
Argentina	5,169	72,159	62,637
Brazil	1,190	60,653	54,539
Chile	3,071	52,771	33,038
Colombia	3,328	49,068	42,677
Peru	3,638	19,149	27,078
Uruguay	377	6,762	8,488
Venezuela	4,084	58,986	38,042
Other South America	85	3,777	2,124
Europe	*9,188*	*234,453*	*157,468*
Belgium	1,409	12,175	3,872
France	629	3,832	4,151
Greece	14	1,907	2,563
Italy	2,030	81,613	39,960
Netherlands	168	1,703	2,300
Russia	23	2,607	5,744
United Kingdom	3,666	39,074	53,661
Other Europe	1,249	91,542	45,157
Far East	*59,097*	*532,564*	*398,394*
British Malaya	661	5,454	6,820
China	7,171	76,886	42,233
Dutch East Indies	5,081	30,450	27,986
India and Ceylon	537	13,657	22,536
Japan and Chosen	36,376	298,019	206,826
Kwangtung	3,308	12,356	16,416
Philippine Islands	3,463	64,527	45,945
Australia	1,301	12,243	20,299
New Zealand	372	1,801	839
Other Asia and Far East	827	12,171	8,494
Africa	*519*	*10,191*	*13,367*
British South Africa	401	4,402	6,129
Egypt	11	3,425	3,041
Mozambique	93	1,006	3,367
Other Africa	14	1,358	830
Total	228,056	2,127,431	1,665,864

Machinery Exports at High Level Again

October 32 Per Cent Above September and Ten-Months Total 13 Per Cent Ahead of 1927—Imports Much Heavier

WASHINGTON, Nov. 30.—Making a gain of $10,166,206, exports of machinery of all kinds in October were valued at $43,079,588, against $32,913,382 in September. For the 10 months ended with October the value was $408,403,112, an increase of $47,119,012 over the value of $361,284,100, representing exports for the corresponding period of last year. Exports of agricultural machinery and implements, totaling $9,045,976 in October, compared with $8,498,000 in September, were an important item in bringing the October shipments up to their high volume. For the 10 months ended with October exports of agricultural machinery and implements were valued at $99,227,997, against $78,355,545 for the corresponding period of 1927.

Exports of power-driven metal-working machinery in October were valued at $2,491,284, against $1,660,115 in September and $1,913,131 in October of last year. For the 10 months ended with October, however, the value was $15,661,121, compared with $21,508,533 for the corresponding period of last year, a decrease of almost $6,000,000. Exports of industrial machinery in October made a striking rise to $20,228,796, against $14,872,197 in September (an increase of $5,356,599) and $16,728,138 in October of last year. For the 10 months ended with October the value was $184,590,371, an increase of $17,437,108 over $167,153,262 for the corresponding period of last year. Exports of metal-working machinery, as shown in our table, totaled 670 units, valued at $1,058,129 in October, compared with 553, valued at $835,866, in September.

Imports of machinery and vehicles in October were valued at $2,732,161, compared with $2,226,391 in September and $2,234,168 in October, 1927. For the 10 months ended October the value was $23,926,913, against $23,337,431 for the corresponding period of last year. Imports of industrial, office and printing machinery in October were valued at $1,708,694, compared with $1,428,520 in September and $1,298,698 in October of last year. For the 10 months ended with October they were valued at $14,914,161, compared with $13,996,093 for the corresponding period of 1927.

Imports of machinery as listed in THE IRON AGE table were valued at $2,127,474 in October, against $1,499,728 in September and $1,495,195 in October of last year. For the 10 months ended with October the value was $17,830,942, compared with $16,683,823 for the corresponding period of last year. An outstanding feature of October imports was the incoming shipments of "other machinery," made up of industrial equipment largely. They rose to $1,068,068, against $780,238 in September and $528,210 in October of last year; for the 10-month periods of 1928 and 1927 the values were $8,339,058 and $6,974,108 respectively.

Of the October imports, shipments to the value of $474,744 came from Germany, of which New York received $250,000. Other countries supplying this class of equipment in October were Sweden, $188,277; United Kingdom, $91,649; Canada, $43,708; and Switzerland, $43,425.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	October		Ten Months Ended October	
	1928	1927	1928	1927
Locomotives	$167	$175	$2,716	$4,584
Other steam engines	65	93	772	1,185
Boilers	135	94	1,130	1,560
Accessories and parts	64	126	527	553
Automobile engines	399	632	11,910	10,154
Other internal combustion engines	768	550	7,344	6,052
Accessories and parts	259	198	2,999	2,829
Electric locomotives	28	208	1,157	1,029
Other electric machinery and apparatus	746	501	6,571	6,185
Excavating machinery	259	404	2,512	4,010
Concrete mixers	108	83	903	965
Road-making machinery	70	104	97	1,807
Elevators and elevator machinery	575	477	3,784	4,123
Mining and quarrying machinery	1,116	1,155	11,234	11,282
Oil well machinery	2,005	1,201	12,896	15,064
Pumps	568	512	4,803	6,313
Bending and power presses	514	170	2,246	1,112
Power hammers	107	95	717	874
Machine tools*	958	1,173	13,177	12,583
Other metal-working machinery and parts	736	428	5,229	3,980
Textile machinery	953	926	10,686	9,285
Sewing machines	742	697	7,129	7,492
Shoe machinery	139	128	1,477	1,372
Flour-mill and gristmill machinery	43	64	378	464
Sugar-mill machinery	574	1,162	387	4,390
Paper and pulp mill machinery	326	356	2,570	3,222
Sawmill machinery	98	78	769	675
Other woodworking machinery	259	115	1,649	1,170
Refrigerating and ice-making machinery	638	402	7,720	6,386
Air compressors	690	432	5,698	4,916
Typewriters	1,638	1,381	17,298	16,793
Power laundry machinery	103	103	980	1,300
Typesetting machines	518	408	3,889	3,655
Printing presses	607	462	5,060	5,135
Agricultural machinery and implements	9,046	5,903	99,228	78,359
All other machinery and parts	17,059	13,015	150,761	120,426
Total	$43,080	$34,011	$408,403	$361,284

*Details of principal items in another table.

Imports of Machinery Into the United States

	October		Ten Months Ended October	
	1928	1927	1928	1927
Metal-working machine tools	$34,552	$31,206	$467,799	$359,346
Agricultural machinery and implements	322,955	427,496	4,074,807	4,809,454
Electrical machinery and apparatus	342,408	250,806	2,256,913	2,500,248
Other power-generating machinery	1,392	305	10,641	9,031
Other machinery	1,068,068	528,210	8,339,058	6,974,108
Vehicles, except agricultural	358,099	257,172	2,681,724	2,031,636
Total	$2,127,474	$1,495,195	$17,830,942	$16,683,823

Exports of Power-Driven Metal-Working Machinery

	October, 1928		September, 1928	
	No.	Value	No.	Value
Engine lathes	60	$122,061	56	$105,444
Turret lathes	41	123,515	14	35,291
Other lathes	87	112,509	46	87,149
Vertical boring mills and chucking machines	4	1,948	6	14,093
Thread-cutting and automatic screw machines	62	88,159	47	57,212
Knee and column type milling machines	26	64,112	26	60,464
Other milling machines	38	69,843	37	65,975
Gear-cutting machines	25	65,215	23	66,719
Vertical drilling machines	31	27,111	19	18,157
Radial drilling machines	10	17,596	14	40,339
Other drilling machines	110	42,540	75	25,103
Planers and shapers	18	35,563	25	39,694
External cylindrical grinding machines	58	161,101	73	128,215
Internal grinding machines	34	70,213	27	55,797
Metal-working tool-sharpening machines	66	56,643	65	36,214
Total	670	$1,058,129	553	$835,866

Machinery Markets and News of the Works

Buying Better Than Expected

November Machine Tool Business Did Not Slump to Extent Usual at This Time of Year

NOVEMBER machine tool business was considerably better than the trade had expected. Sales by some companies were fully equal to those of either September or October, and a Cleveland manufacturer of turret lathes reports that its November volume was the largest for any month this year.

A recent statement by the National Machine Tool Builders' Association that November and December are normally months of reduced volume in machine tool buying finds contradiction this year, and the outlook is for a continued good demand during December, although the time is approaching for year-end inventories. The fact that industry generally is planning for a maintenance of present production schedules in the early part of 1929, and that machine tools ordered now cannot in many instances be delivered until February, account in part at least for orders which normally might be postponed until after Jan. 1.

One of the developments of the past week was a revival of buying by railroads, which have been conspicuously light purchasers this year. The Norfolk & Western has ordered a number of the tools on the list it issued several weeks ago and will buy the remainder during the next week or two. The Southern is inquiring for six machines. The Louisville & Nashville is ordering for its 1929 program, for which a large appropriation has been authorized. The Chicago, Milwaukee, St. Paul & Pacific has ordered six tools and the New York Central has bought two engine lathes.

Detroit still figures prominently in machine tool demand. Further changes in models by companies in the low-priced class will probably result from the showing of the new Chevrolet six-cylinder car. A Detroit automobile company's inquiry for about $500,000 worth of equipment for making crankshafts, mentioned a week ago, has not been acted upon.

The Whiting Corporation, Harvey, Ill., has issued an inquiry for 21 tools.

A European automobile manufacturer has purchased in this country 40 small and four crankshaft lathes.

New York

NEW YORK, Dec. 4.—Following the recent heavy purchasing by the Wright Aeronautical Corporation, Paterson, N. J., the machine tool market was not so active the past week as in the week before, but there was a good volume of business. For some sellers in this market November was one of the best months of a very good year. The International Motor Co. bought tools for its plants at Plainfield and New Brunswick, N. J., and the printing press firm of R. Hoe & Co., which has recently been a large buyer, continued to place orders for miscellaneous tools. The volume of business in prospect is still large enough to encourage the expectation that buying will not materially fall off in December, which is usually a month of reduced volume, because of the practice of many manufacturers to take inventory at the year end.

Some prospective buyers of tools, finding that deliveries on orders placed now are in many instances not to be had earlier than February, are expected to buy this month, when under other circumstances their purchases might be postponed until after Jan. 1. One instance of a sale of a machine tool with a penalty clause attached is reported; the seller is to pay $25 a day forfeit for delivery later than Feb. 15, and the buyer will pay a like amount per day if the shipment is received before that date.

The Niles-Bement-Pond Co. has sold during the past week a 100-ton bushing press, 5000-lb. double-frame steam hammer, 36-in.-44-in. sidehead boring mill, two 4-spindle drum type milling machines, 44-in. heavy-duty boring mill, 6-ft. Morris radial drill, a Long & Allstatter punch and shear and other miscellaneous tools, while the Pratt & Whitney division included among its sales six 13-in. and four 16-in. lathes, three 7-in. bench lathes, three 14-in. vertical surface grinders, two jig borers, two die sinkers and three thread milling machines.

Pioneer Instrument Co., Inc., 754 Lexington Avenue, Brooklyn, manufacturer of aircraft instruments, has asked bids on general contract for two-story addition and improvements in present factory to cost $60,000. R. M. Segal, 475 Fifth Avenue, New York, is architect.

Streloff-Naughton Corporation, Long Island City, manufacturer of aluminum tanks, etc., has leased space in building at Harris Avenue and William Street, for new plant.

Garford Motor Truck Co., Thirteenth Avenue and William Street, Long Island City, with main plant at Lima, Ohio, is said to be planning early call for bids for two-story addition, 100 x 215 ft., to local factory branch, to cost about $100,000 with equipment. Frank S. Parker, 119 West Fifty-seventh Street, New York, is architect and engineer.

Foote, Pierson & Co., 160 Duane Street, New York, manufacturers of electric signal devices, instruments, have leased two-story and basement factory at 73-77 Hudson Street, Newark, and will remove to new location and increase output.

J. C. Watson, 271 West 125th Street, New York, architect, has plans for a two-story automobile service, repair and garage building, 106 x 126 ft., to cost $100,000 with equipment.

Department of Street Cleaning, Municipal Building, New York, has secured an appropriation of $5,000,000 for construction of four incinerator and reduction plants, two in Manhattan and two in Bronx Boroughs, including furnaces, preheaters, flues, conveying machinery and other equipment. Alfred Taylor is street cleaning commissioner.

Lawton-Stephens Co., 427 Marcy Avenue, Brooklyn, manufacturer of sheet metal products, has awarded general contract to C. Salenger, 194 Freeman Street, for one-story plant to cost about $30,000 with equipment.

Union High School District, Elmont, N. Y., plans installation of manual training equipment in new central high school at Floral Park to cost $800,000, for which bids will be asked on general contract about middle of month. Knappe & Morris, 171 Madison Avenue, New York, are architects.

Empire State Ice Co., Ninth Avenue and 219th Street, New York, has filed plans for one-story ice-manufacturing plant, 100 x 150 ft., with refrigerating division, to cost about $240,000 with machinery. Wigton-Abbott Corporation, 552 West Twenty-third Street, is engineer.

Lionel Corporation, 605 South Twenty-first Street, Irvington, N. J., manufacturer of electric toys, has awarded general contract to Austin Co., New York, for one and two-story addition, 390 x 620 ft., to cost over $200,000 with equipment.

Klemm Co., Inc., Paramount Building, New York, organized a few months ago with capital of $630,000 to manufacture

The Crane Market

NEW inquiry for overhead equipment continues small, but a number of orders for single cranes are expected to be placed before the end of the year. One builder of overhead cranes reports the sale recently of nine, consisting of a 100-ton, 71-ft. 6-in. span, 30-ton, 20-ft. 2-in. span, two 5-ton and one 3-ton, 32-ft. 8-in. span, two 15-ton, 76-ft. 6-in. span, a 20-ton, 23-ft. span and a 5-ton, 21-ft. 5-in. span. No improvement in locomotive crane business is reported, but further buying of power shovels has been made by contractors. Youngstown Sheet & Tube Co., Youngstown, is taking bids on 11 cranes of various capacities for the new bar mills at its Indiana Harbor works.

Among recent purchases are:

Thomas Crimmins Contracting Co., 734 Lexington Avenue, New York, steam driven shovel from Bucyrus-Erie Corporation.

John H. Heald Co., Lynchburg, Va., 7½-ton crawl-tread crane from Browning Crane Co.

Joseph Corbiscello & Sons, Fairview, N. J., truck crane from Browning Crane Co.

Forment & Co., 150 Bank Street, New York, 2-ton special electric traveling crane from unnamed builder.

Apollo Steel Co., Apollo, Pa., a 10-ton, 69-ft. span crane from Northern Engineering Works.

Youngstown Sheet & Tube Co., a 10-ton, 35-ft. span crane from Shaw Crane Works.

aircraft, and occupying under temporary arrangement part of plant of Aeromarine Plane & Motor Co., Keyport, N. J., will purchase entire plant, comprising 230 acres and 21 buildings, with mile frontage on Raritan Bay, and will expand for monoplane parts and assembling. A stock issue will be sold to carry out development. Inglis M. Uppercu, head of Uppercu Cadillac Corporation, 70 Columbus Avenue, New York, automobiles, is president.

Board of Education, 31 Green Street, Newark, R. D. Argue, secretary, is asking bids until Dec. 12 for pumps and air compressor, supply cabinets, work benches, domestic science tables, hardware, iron and steel, gas plates, electrical supplies, etc.

Prest-O-Lite Co., Inc., 30 East Forty-second Street, New York, is considering rebuilding part of plant at Port Newark, Newark, destroyed by fire Nov. 23. Two of group of eight buildings were destroyed.

A. F. Strafer has purchased warehouse and machinery stock of Severin Strafer Machinery Corporation, Jersey City, and will conduct business as Strafer Machinery Co., with office and warehouse at Fourteenth and Provost Streets.

Reading Chain & Block Corporation, Reading, Pa., maker of material handling equipment, has removed New York office from 11 Park Place to 30 Church Street.

New England

BOSTON, Dec. 3.—Business in the local machine tool market the last week in November fell off. Activity centered largely in small used lathes, drilling tools and miscellaneous bench equipment. The lull is believed to be temporary, many users having signified their intentions of purchasing before the close of the year. November sales of dealers in general were well above those for October and were also larger than those for November, 1927.

With New England industries better employed than in months, machine tool houses look for good business during the first quarter of 1929.

Holland & Kenyon Machine Co., 56 North Street, Fitchburg, Mass., has completed plans for a one-story machine shop, 32 x 46 ft.

City of Cranston, R. I., has awarded a contract for a two-story and basement grammar school, 110 x 208 ft., to contain a manual training department. A. A. Rhodes is mayor. William R. Walker & Son, 49 Weybosset Street, Providence, R. I., are architects.

Precision Electric Tool & Mfg. Co., production tools, dies and special equipment has located at 98 Union Street, Worcester, Mass. Company will also make an electric valve grinder. Tool department is under supervision of Arvid Fyrberg, and Edward Johnson is head of grinder department. J. Vistor Parent is general manager and treasurer.

Bids are being asked by Hart Mfg. Co., Hamilton Street, Hartford, Conn., manufacturer of electrical equipment and supplies, for one-story addition, 60 x 120 ft., to cost about $40,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are architects and engineers.

Rhode Island Grinding & Mfg. Co., 263 Richmond Street, Providence, has awarded general contract to P. J. Flynn, 17 Exchange Street, for one-story addition, 50 x 55 ft.

Boston Elevated Railway Co., 31 St. James Avenue, Boston, has plans for one-story repair works, 85 x 150 ft., to include boiler house and automobile service units, to cost about $100,000 with equipment.

Packard Motor Car Co., 1089 Commonwealth Avenue, Boston, has filed plans for addition to service, repair and sales building, including improvements in present plant, to cost $400,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Harrington, Robinson & Co., 110 High Street, Boston, iron and steel products, have leased property totaling 21,200 sq. ft. of land, with one two-story building and two one-story shops, and will remodel for new storage and distributing plant.

Department of Public Works, City Hall, Providence, R. I., has completed plans for one-story equipment and repair shop to cost about $70,000 with equipment. T. J. H. Pierce, City Hall, is city engineer.

Buffalo

BUFFALO, Dec. 3.—Harrison Radiator Corporation, Lockport, N. Y., manufacturer of automobile radiators, has plans for three-story addition, totaling 72,000 sq. ft. floor space, to cost $130,000 with equipment.

Sherer-Gillett Co., Marshall, Mich., manufacturer of automatic refrigerators for butchers, grocers, etc., will discontinue operations at branch plant at Herkimer, N. Y., and will remove equipment to Marshall, where production will be concentrated in future. Expansion will be carried out at latter plant.

Continental Can Co., Syracuse, N. Y., has purchased Bedford Can Co., Bedford, Va. New unit will work in close cooperation with plants of Wheeling Can Co., Wheeling, W. Va., recently taken over.

DuPont Rayon Co., River Road, Buffalo, has authorized construction of power plants at branch rayon mills in course of erection at Ampthill, near Richmond, Va., and Waynesboro, Va., each to cost over $100,000 with equipment.

Louis L. Babcock and Hugh McRuss, 610 Manufacturers' and Traders' Building, Buffalo, have organized United States Body & Forging Co. and plan early operation of plant to manufacture automobile radiators, fenders and kindred products.

Endicott Forging & Mfg. Co., Endicott, N. Y., has let contract to H. B. Van Ness, local contractor, for addition to die room, 25 x 116 ft., and addition to heat treating department, 40 x 80 ft. Company has also placed orders for two Tramrail cranes, 48 x 48-in. x 12-ft. planer, 48-in. boring mill, a 3000-lb. friction board drop hammer and a continuous heat treating and drawing furnace. S. J. Marshall is president.

Philadelphia

PHILADELPHIA, Dec. 3.—Philadelphia Storage Battery Co., Ontario and C Streets, Philadelphia, has taken over factory adjoining property, totaling more than 80,000 sq. ft. floor space, to manufacture radio sets. It is purposed to double present output of 2000 sets per day.

National Umbrella Frame Co., Belfield Avenue, near Penn Street, Philadelphia, has awarded general contract to Truscon Steel Co., 1505 Race Street, for two-story addition, 60 x 183 ft., to cost about $50,000 with equipment.

Reliance Bronze & Aluminum Foundry Co., Philadelphia, recently organized by Alfred Haeberle, 268 West Fishers Avenue, and associates, plans early operation of local plant to manufacture aluminum, brass, bronze and other metal castings. Arthur W. Schuller, 7172 North Twentieth Street, is also interested in company.

A-Z Radiator Repair Co., Philadelphia, has leased three and four-story building at 1318 Ridge Avenue for new plant for automobile radiator manufacture and repairs.

Ajax Metal Co., 46 Richmond Street, Philadelphia, has awarded general contract to M. Ward Easby, 1505 Race

Street, for two-story addition, 52 x 60 ft., to cost about $25,000 with equipment.

Hoffman Motors Co., Trenton, N. J., local representative for Durant and Moon automobiles, has begun work on two-story service, repair and sales building, 80 x 125 ft., and will install machine and repair shop on first floor, with parts department on second floor.

Board of Education, Glassboro, N. J., plans installation of manual training equipment in high school to cost about $400,000, for which bids will soon be asked on general contract. Ritter & Shay, Packard Building, Philadelphia, are architects.

Borough Council, West Conshohocken, Pa., plans installation of electrically-operated pumping machinery and auxiliary equipment in extensions in sewage plant and system, to cost $200,000. Canter, Edgar & Wittwer, 428 Market Street, Camden, N. J., are consulting engineers.

J. Munson Lee, Phillipsburg, N. J., and associates have organized Lee Metal Products Co., with capital of $100,000, and will operate local plant to manufacture iron, steel, nickel and other metal goods. George H. Tay, Phillipsburg, will be an official of new company.

Board of Delaware County Commissioners, Court House, Media, Pa., is having plans drawn for central steam power plant in Snowden district, to cost more than $75,000 with equipment. C. W. Brazer, Crozer Building, Chester, Pa., is architect.

Pennsylvania Forge Co., Philadelphia, maker of forgings, die blocks and forged steel pipe flanges, has removed its main office and manufacturing plant to larger quarters at Milnor and Bleigh Streets, Tacony, Philadelphia.

Blue Ridge Pipe & Nipple Co., Greenstone, Adams County, Pa., has started manufacture of black and galvanized pipe nipples in plant at above address. L. E. Beck and C. A. Wills are owners.

Barber-Colman Co., Rockford, Ill., has appointed W. M. Oplinger, 1023 Widener Building, Philadelphia, representative in Philadelphia territory for milling cutters and hobs, and Lloyd & Arms, Inc., 133 South Thirty-sixth Street, Philadelphia, representative for hobbing machines and hob sharpening machines.

Pittsburgh

PITTSBURGH, Dec. 3.—Sales of machine tools reached a good total last month, although not up to expectations based upon a brisk inquiry. Business the past week has been featured by the placing of a few tools on its fourth quarter list by the Westinghouse Electric & Mfg. Co. It is expected that some of the tools inquired for recently in a special list will be bought before the end of the month. The Carnegie Steel Co. has not completed tabulation of bids on its list of tools for its Duquesne works.

Fisher Scientific Co., 711 Forbes Street, Pittsburgh, manufacturer of scientific instruments, laboratory equipment and supplies, is having plans drawn for addition to cost about $75,000 with equipment. M. Nirdlinger, Empire Building, is architect.

Metropolitan Paving Brick Co., Bessemer, Pa., is said to be planning early rebuilding of part of plant destroyed by fire Nov. 28. Machine shop, boiler plant, conveying equipment and other buildings were burned. Headquarters are at Canton, Ohio.

Plant and business of Fry Equipment Corporation, Rochester, Pa., manufacturer of gasoline pumps, lubricating apparatus, etc., have been acquired by Wayne Pump Co., Fort Wayne, Ind. It is understood that Rochester works will be continued and output increased.

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, has awarded general contract to H. M. Byllesby Engineering & Management Co., 231 South La Salle Street, Chicago, for addition to steam-operated electric generating plant on Brunots Island, to cost about $3,000,000 with equipment.

Mars Co., Oil City, Pa., subsidiary of United Natural Gas Co., plans rebuilding gasoline refinery at Hampton Station, about 10 miles from Oil City, destroyed by fire Nov. 23.

Pennsylvania Railroad Co., Philadelphia, has awarded general contract to Croseau Construction Co., Brownsville, Pa., for new engine house and locomotive repair shop, locker building, and other structures at Benwood, near Wheeling, W. Va., to cost about $90,000 with equipment.

Turner Aircraft Corporation, Rochester, N. Y., represented by A. W. Legge, Bradford, Pa., has plans for one-story airplane plant at Bradford, including parts and assembling departments, to cost over $35,000 with equipment.

Pittsburgh Foundry & Machine Co., foot of Thirty-sixth Street, Pittsburgh, is not planning additions to present plants or building operations of any kind, as stated in our issue of Nov. 22.

South Atlantic

BALTIMORE, Dec. 3.—Contract has been let by National Enameling & Stamping Co., 1901 Light Street, Baltimore, to Austin Co., Cleveland, for one-story addition, 90 x 168 ft., to cost about $35,000 with equipment.

Crown Cork & Seal Co., Highlandtown, Baltimore, manufacturer of metal bottle caps, bottle-capping machinery, etc., is said to be arranging an expansion and improvement program to cost more than $1,000,000. L. R. White, Hearst Tower Building, architect, is preparing plans for three new units.

Board of Education, Savannah, Ga., is said to be planning installation of manual training equipment in two-story and basement high school to cost about $275,000, for which plans have been completed. Wallin & Comer, Realty Building, are architects.

Bureau of Street Cleaning, Municipal Office Building, Baltimore, is considering one-story equipment and repair shop at 1139 Granby Street, with automobile service and repair department for motor trucks, etc., to cost about $100,000 with equipment.

Nu-Idea Desk Co., Darlington, S. C., manufacturer of school desks, etc., has plans for new one-story plant at Sumter, S. C., with main unit of 20,000 sq. ft. floor space, and smaller buildings, to cost more than $75,000 with machinery. Present plant will be removed to new location.

Potomac Electric Power Co., Washington, is carrying out expansion and improvement program at local Benning steam-operated electric generating plant, to include installation of 30,000-kw. generator and auxiliary equipment. Entire project will cost over $2,600,000.

Carolina Paper Co., Charlotte, N. C., is planning one-story storage and distributing plant, 100 x 300 ft., to cost over $50,000 with equipment.

Wilmington Naval Stores Co., Wilmington, N. C., D. J. Herring, head, has begun construction of new plant near Wilmington, for production of turpentine, rosin and kindred products, to cost over $80,000 with equipment.

Common Council, Sanford, N. C., has approved plans for municipal airport, including hangar, repair shop and other units.

East Coast Utilities Co., Richmond, Va., operating electric light and power, and ice-manufacturing plants in Virginia, Maryland and North Carolina, has arranged for bond issue of $1,000,000, portion of proceeds to be used for extensions and improvements in properties

Cutler-Hammer Mfg. Co., Milwaukee, maker of electrical control apparatus, has removed its Atlanta, Ga., office to larger quarters at 150 Peters Street, Southwest. In addition to sales and engineering service on motor control apparatus and wiring devices, warehouse is maintained where many products will be carried in stock for immediate shipment. A. C. Gibson is in charge.

William Steele & Sons Co., Fifteenth and Cherry Streets, Philadelphia, engineer and contractor, is preparing plans for new textile mill at Pulaski, Va., for Virginia Maid Hosiery Mills, to include machine shop, power house and other units in addition to main mill, to cost about $200,000 with machinery.

Barber-Colman Co., Rockford, Ill., has appointed J. R. Walraven, Forsythe Building, Atlanta, Ga., representative in Georgia for hobbing machines, hob sharpening machines, milling cutters and hobs.

Detroit

DETROIT, Dec. 3.—Auto-Rad Electrical Corporation, Adrian, Mich., manufacturer of radio receiving sets, is arranging for additional space for increased output in factory now occupied in part.

Crane Co., 836 South Michigan Avenue, Chicago, is having plans drawn for one-story factory branch and distributing plant at Flint, Mich., with pipe-cutting and threading department, etc., to cost about $45,000 with equipment. George Bachman, Pengelly Building, Flint, is supervising architect.

Upton Machine Co., Edgewater Street, St. Joseph, Mich., manufacturer of electric washing machines and parts, has plans for one-story unit, 100 x 250 ft., to cost about $85,000 with equipment.

Hayes Body Corporation, Ionia, Mich., is carrying out an expansion and improvement program to cost about $450,000. Approximately one-half of this sum will be used for extensions at local body-building plant and other half for enlargement of metal stamping plant at Grand Rapids, Mich.

Stout Metal Airplane Division of Ford Motor Co., Dearborn, Mich., is said to be planning one-story addition, to cost over $75,000 with equipment.

General Foundry & Machine Co., Flint, Mich., is expanding its plant at Marshall, Mich., including installation of additional equipment.

American Forging & Socket Co., Pontiac, Mich., has plans for two additions,

one and two stories, 55 x 80 ft., and 100 x 120 ft., to cost over $80,000 with equipment. Wright & Nice, General Motors Building, Detroit, are architects.

Reynolds Spring Co., Jackson, Mich., has purchased plant and business of National Appliance Co., Inc., Linden, Mich., manufacturer of interior and exterior flood lighting equipment. Equipment will be removed to Jackson where branch will be established for production of National company specialties. J. L. Brownell, formerly president of last-noted company, will continue as vice-president in charge of engineering.

Air Reduction Sales Co., 342 Madison Avenue, New York, manufacturer of acetylene welding apparatus, etc., has filed plans for one-story factory branch and distributing plant at Flint, Mich., to cost about $35,000 with equipment.

Detroit Edison Co., 2000 Second Avenue, Detroit, has plans for new power substation and outdoor switching plant at Bunce Creek, Port Huron, Mich., to cost about $300,000 with equipment.

Kirk & Blum Mfg. Co., Cincinnati, maker of shavings and dust collecting systems, ventilating, drying and air conditioning equipment, industrial ovens and sheet metal products, is opening a branch factory with sales and engineering office at 4718 Burlingame Street, Detroit. Present district office in General Motors Building will be removed to new address.

Huron Forge & Machine Co., 9041 Alpine Avenue, Detroit, manufacturer of drop forgings, has started construction of a one-story addition to provide for larger output.

Cleveland

CLEVELAND, Dec. 3.—Machine tool business is holding up well and while inquiry slowed down somewhat during the week it is exceedingly good for this season of the year, as December is usually a rather quiet month. A local builder of turret lathes reports that November was the best month of the year in the volume of sales. Business is well distributed, a larger percentage coming from fields outside of the automotive industry than recently. The Curtiss Aeroplane & Motor Corporation, Buffalo, which has been buying small lots of machinery, has a number of tools yet to be placed.

Sales during the week included a 24-in. and a 16-in. lathe to Erie Foundry Co., Erie, Pa.; 13-in. lathe to Pittsburgh Plate Glass Co. for its Columbia division, Barberton, Ohio; jig borer to Rediator Engineering Co., Toledo, and a used 90-in. boring mill to Wheeling & Lake Erie Railroad. This railroad is still in the market for a wheel press and punching machine.

Lamson & Sessions Co., 1971 West Eighty-fifth Street, Cleveland, manufacturer of bolts, nuts, etc., is having plans drawn for four-story addition, including improvements in present plant, to cost more than $100,000. George S. Rider Co., Century Building, is architect and engineer.

Ohio Cut Stone Co., South Amherst, Ohio, is planning to rebuild part of plant destroyed by fire Nov. 26.

Canton Drop Forge Co., Canton, Ohio, is completing plans for one-story plant, 70 x 320 ft., to cost about $90,000 with equipment.

Edward Ford Plate Glass Co., Rossford, Ohio, is said to be planning additions, including main glass-making unit, grinding and polishing plant, and storage and distributing plant, to cost more than $2,000,000 with machinery.

Indian Lake Motor Boat Co., Lima, which recently changed name to Dart Boats, Inc., has plans for new one-story boat-building and repair plant, 65 x 300 ft., at Toledo, Ohio, to cost more than $75,000 with equipment.

Brown Fence & Wire Co., 6532 Juniata Avenue, Cleveland, recently formed to take over company of same name has arranged for stock issue to total $6,187,500, a portion of proceeds to be used for expansion. Company also operates Peerless Wire & Fence Co., with plants at Adrian, Mich., and Memphis, Tenn. Frank Spitz is president.

Cincinnati

CINCINNATI, Dec. 3.—From the standpoint of sales November turned out to be comparable with September and October for local machine tool builders. While some companies report that bookings slumped somewhat in the past 30 days, others showed a gain sufficient to keep the average at the high level of recent months. Pending business is of large volume and indications are that buying will continue heavy well into next year. Some manufacturers have quoted lately on as much as $150,000 worth of equipment and inquiries among the trade reveal the fact that many users are planning to replace obsolete equipment in the next few months.

Outstanding in the past week's transactions was an order for several lathes placed with a local builder by a European automobile maker. An Eastern airplane motor company has bought a large amount of equipment from Cincinnati machine tool plants and is expected to make further purchases soon. A revival of buying on the part of railroads is noted. The Norfolk & Western has contracted for a number of tools on its recent list and will order the remainder during the next week or two. Southern Railway is inquiring for about six machines, while the Louisville & Nashville has begun purchasing tools on its 1929 program, for which an appropriation has been authorized. The New York Central bought two large engine lathes the past week.

Detroit still is figuring conspicuously in machine tool activities. Purchases by automobile manufacturers continue impressive. A large Detroit company is reported not yet to have acted on its inquiry for about $500,000 worth of equipment.

C. O. Sherrill, city manager, Cincinnati, will take bids at once for hangar with repair facilities at municipal airport, 112 x 114 ft., to cost about $50,000. Robert M. Olin, city service director, is in charge.

Crowe Mfg. Corporation, 317 Sycamore Street, Cincinnati, manufacturer of electric-operated safety saws and other equipment, has arranged for stock issue to total $587,500, part of proceeds to be used for expansion in manufacturing.

Charles Hock, Realty Building, Dayton, Ohio, architect, has plans for multi-story automobile service, repair and garage building to cost $150,000 with equipment.

Union Utilities, Inc., 46 Cedar Street, New York, operating Memphis Natural Gas Co., Memphis, Tenn., is considering construction of pipe line for natural gas supply to Nashville, Tenn., and vicinity, about 200 miles from supply base, to cost more than $5,000,000. Company has recently begun building line from Monroe, La., to Memphis, to cost close to like sum.

Board of Education, Hamilton, Ohio, has authorized installation of manual training department in new three-story high school to cost about $400,000, for which bids are being asked on general contract until Dec. 18. F. J. Muller Rentschler Building, is architect.

American Glanzstoff Corporation, Elizabethton, Tenn., plans extensions in power house, machine shop and other departments in connection with new unit at local rayon mill to cost more than $4,000,000. Headquarters are at 180 Madison Avenue, New York.

Louisville Frog, Switch & Signal Co., Louisville, has been organized to take over and consolidate Louisville Frog & Switch Co., and Southern Signal Co., both with local plants, last noted specializing in production of castings as well as signal equipment. It is purposed to continue both plants in operation.

Oakley Pattern & Foundry Co., 4423 Verne Avenue, Cincinnati, has awarded general contract to Erwin Hoinke for an addition, 43 x 80 ft., which will increase manufacturing space 70 per cent.

Ohio Power Co., Newark, Ohio, plans construction of steel tower transmission line from generating plant at Philo to Fostoria, Ohio, and vicinity, about 125 miles with power substation and switching plant at last noted place, to cost more than $850,000. Company will also build similar transmission line from Philo station to South Bend, Ind., and vicinity.

Chicago

CHICAGO, Dec. 3.—The local machine tool market remains moderately active, with sales and inquiry from widely scattered sources. The list issued several weeks ago for the Fort Wayne works of the International Harvester Co. is still open. Of special interest among new inquiries is a list of 21 tools for the Whiting Corporation, Harvey, Ill. The Chicago, Milwaukee, St. Paul & Pacific has ordered six tools for delivery to points along its lines. Miscellaneous orders for punch presses and ball-bearing drills are noteworthy. Used machine tools are moving freely in a market that is more liberally supplied than of late.

Following the announcement a week ago that several builders had advanced prices are reports that a number of lines may be advanced about Jan. 1.

Des Moines Steel Tank Co., 1819 East Court Avenue, Des Moines, Iowa, is having plans prepared for a warehouse and an addition to its factory.

Raffel Mfg. Co., 4443 Armitage Avenue, Chicago, manufacturer of radio parts, will build a factory at 4528 Fullerton Avenue, to cost $50,000.

Industrial Steel & Supply Co., Chicago, has removed its offices to 1964 Building, 228 North La Salle Street.

Monarch Tractor Corporation, Springfield, Ill., subsidiary of Allis-Chalmers Mfg. Co., West Allis, Wis., has asked bids on general contract for two one-story plant units, 100 x 200 ft., and 80 x 250 ft., to cost over $200,000 with equipment.

Federal Sign Co., 1215 Nicollet Avenue, Minneapolis, Minn., manufacturer of electric displays, has awarded general contract to M. Schumacher, 104 South Ninth

Street, for two-story plant to cost $35,000 with equipment. Larson & McLaren, Baker Building, are architects.

Raffel Mfg. Co., 4443 Armitage Avenue, Chicago, manufacturer of radio equipment and parts, has acquired property, 100 x 135 ft., at 4528 Fullerton Avenue for new plant to cost approximately $50,000 with machinery and will remove to new location.

Western Screw Mfg. Co., 4413 Kinzie Street, Chicago, has awarded general contract to A. Larson, 19 South La Salle Street, for one-story addition, 25 x 100 ft. Ralph H. Oliver, 115 South Dearborn Street, is architect.

Grau-Curtis Co., 613 First Avenue, N. E., Minneapolis, Minn., manufacturer of furniture, will take bids at once for two-story factory, 137 x 145 ft., to cost about $100,000 with equipment. Lang, Raugland & Lewis, Essex Building, are architects.

Velie Motor Corporation, Moline, Ill., is arranging to discontinue manufacture of automobiles, and will devote local plant to production of airplanes, largely of monoplane type.

Midway Chevrolet Co., 1641 University Avenue, St. Paul, Minn., local representative for Chevrolet automobile, has plans for one-story service, repair and sales building, 120 x 125 ft., to cost about $100,000 with equipment. P. E. Crosier, New York Life Building, Minneapolis, Minn., is architect.

Gulf States

BIRMINGHAM, Dec. 3.—City Council, Austin, Tex., is planning extensions and improvements in municipal electric light and power plant, to cost more than $350,000 with equipment. United Engineers & Constructors, Inc., Grand Avenue and Lincoln Highway, Philadelphia, is engineer.

Universal Car Loading & Distributing Co., Mercantile Bank Building, Dallas, Tex., is planning new storage and distributing plant, primarily for handling automobiles, including loading docks, about 400 ft. long. An electric traveling crane will be installed. Project will cost more than $100,000.

United Gas Co., operating Houston Gulf Gas Co., Houston, Tex., and other natural gas properties, is planning an expansion and improvement program, including construction of about 1000 miles of pipe lines, increase in producing properties and purchase of Duval Texas Sulphur Co. A stock issue of $3,000,000 is being sold, part of fund to be used for development.

War Department, Washington, has authorized improvements at flying field at Galveston, Tex., including fund of $19,369 for extensions in machine shops.

Wilton Dubus and Frank Atwood, Crowley, La., have purchased controlling interest in Acadia Iron Works, with local plant, heretofore held by J. T. Hinchliffe. New owners plan expansion. Company name will be changed to Dubus & Atwood.

Williams Auto Top Co., Dallas, Tex., is arranging for early occupancy of new factory, one story, 65 x 200 ft., now in course of construction, which has been secured under lease.

Roxana Petroleum Co., City National Bank Building, San Antonio, Tex., is completing plans for construction of new oil refinery near Houston, Tex., to cost more than $500,000 with equipment. Company will also construct 450-mile pipe line to refinery for crude oil supply.

C. B. Schoeppl, Florida Theater Building, Jacksonville, Fla., architect, has plans for three-story automobile service, repair and garage building, 100 x 125 ft., to cost about $100,000 with equipment.

Prest-O-Lite Co., 6119 Harrisburg Road, Houston, Tex., has awarded general contract to Donald Hall, Cotton Exchange Building, for two buildings, for factory branch, storage and distributing service, to cost $40,000. Headquarters are at 30 East Forty-second Street, New York.

Humble Oil & Refining Co., Houston, Tex., has begun foundations for new gasoline refinery at Ingleside, Tex., to cost more than $850,000 with machinery. Company is reported planning new oil refinery near Neches, Tex., where 15-acre tract recently was secured. Humble Pipe Line Co., a subsidiary, will proceed with installation of three-unit pumping station near Sweetwater, Tex., to cost about $140,000, for booster service for pipe line to Hawley, Tex.

Barber-Colman Co., Rockford, Ill., has appointed Rosenfelder Machinery Co., 1024 Post Dispatch Building, Houston, Tex., representative in that territory for hobbing machines, hob sharpening machines, hobs and milling cutters.

St. Louis

ST. LOUIS, Dec. 3.—Contract has been let by United Cold Storage Co., 2101 West Pershing Road, Chicago, to E. W. Sproul Construction Co., 310 South Michigan Boulevard, for eight-story addition to ice-manufacturing and cold storage plant at Kansas City, Mo., to cost about $900,000 with equipment.

Phillips Petroleum Co., Bartlesville, Okla., has authorized construction of new gasoline refinery in Noodle Creek district, Tex., to cost about $70,000 with equipment.

Kansas City Power & Light Co., Fourteenth Street and Grand Avenue, Kansas City, Mo., has awarded general contract to Fleming-Gilchrist Construction Co., 3525 Broadway, for four-story automobile service, repair and garage building, 125 x 140 ft., to cost over $175,000.

Cessna Aircraft Co., Wichita, Kan., has arranged for stock issue to total $131,250, part of proceeds to be used for expansion in output.

N. S. Sherman Machine & Iron Works, 18 East Main Street, Oklahoma City, Okla., has awarded general contract to H. W. Underhill Construction Co., Braniff Building, for one-story addition, 50 x 140 ft., to cost about $35,000.

Sinclair Refining Co., 1921 Harrison Street, Kansas City, Mo., is said to be planning new oil storage and distributing plant at Nebraska City, Neb., to cost about $100,000 with equipment.

Seaman-Dunning Corporation, West Fourth Street, Pine Bluff, Ark., affiliated with Nash Motors Co., Kenosha, Wis., has plans for third unit at local plant, one story, 215 x 280 ft., to manufacture bodies for Nash automobiles, to cost more than $160,000 with equipment.

Bradford Armature Works, 315 East Broadway, East St. Louis, Ill., has asked bids on general contract for one-story and basement plant, 50 x 71 ft., to cost more than $26,000 with equipment. Seer-Ka Engineering Co., 1732 North Twenty-fifth Street, is engineer.

Coffman Aircraft Co., Oklahoma City, Okla., has begun construction of one-story airplane plant, 60 x 120 ft., to include parts manufacture and assembling, to cost about $35,000.

Wilcox Oil & Gas Co., Bristow, Okla., John J. Kerins, manager, has plans for new oil refinery, to cost over $100,000 with equipment.

Standard Steel Works, North Kansas City, Mo., has been organized to manufacture oil storage tanks, dump bodies for trucks, grain blowers, airplanes, heating and ventilating equipment and other fabricated sheet steel products. Company also has engineering service for working out details of special mill and elevator jobs, smelters, zinc plants, etc.

Indiana

INDIANAPOLIS, Dec. 3.—Contract has been let by Auburn Automobile Co., Auburn, Ind., to Austin Co., Cleveland, for additional units at Connersville plant, to cost over $300,000 with equipment.

Chevrolet Aviation Motors Corporation, Tenth and Fayette Streets, Indianapolis, an interest of Chevrolet Brothers Mfg. Co., manufacturer of automobile motor equipment, is said to be planning one-story unit to cost over $40,000.

Schwitzer-Cummins Co., 1125 Massachusetts Avenue, Indianapolis, manufacturer of mechanical fans for automobiles and tractors, has filed plans for one-story addition, 125 x 145 ft., to cost about $45,000 with equipment.

Chambers Mfg. Co., Shelbyville, manufacturer of fireless cookers, etc., has awarded general contract to Harry O. Phares, Shelbyville, for two-story and basement addition to cost $35,000.

Common Council, Washington, Ind., is planning establishment of municipal airport, including hangar, repair shop and other buildings.

Columbia Canning Co., Cambria, Wis., is planning new plant at Shelbyville, including power house and machine shop, to cost $115,000 with equipment. Shelbyville Better Business Club is interested in project.

Peerless Foundry Co., 1843 Ludlow Street, Indianapolis, has filed plans for one-story addition, to cost about $25,000 with equipment.

R. & R. Mfg. Co., Anderson, maker of overhead valve equipment for motor cars, will remove plant and offices to new quarters at Madison and Nichol Avenues.

Diamond Separator Co., Franklin, Ind., is reported planning one-story addition to cost over $30,000 with equipment.

Fibroc Insulating Co., Valparaiso, L. T Frederick, president, has engaged Lockhart & Fett, Associates Building, South Bend, architects, to prepare plans for one-story plant, 110 x 350 ft., with power house, to cost $100,000 with equipment.

Pacific Coast

SAN FRANCISCO, Nov. 28.—Contract has been let by Water Works Supply Co., Oakland, Cal., manufacturer of power and mechanical equipment, to H. J. Christiansen, Ray Building, for two-story plant, 50 x 76 ft. A. Froberg, 505 Seventeenth Street, is architect.

Board of Education, Los Angeles, Architectural Division, has plans for new high school group on Santa Barbara Avenue, to cost about $350,000, to include one-story vocational shop. Bids will be asked on general contract early in January.

Lake Airways, Inc., Lakeport, Cal., recently organized by H. W. Hughson and associates, has secured lease from City Council for establishment of airport, to include hangar, repair shop and other units, to cost about $50,000.

Richfield Oil Co., Bartlett Building, Los Angeles, is planning for airport near properties at Merced, Cal., including six-plane hangar, repair shop and other structures, to cost in excess of $90,000.

Linde Air Products Co., 351 Everett Street, Portland, with headquarters at 30 East Forty-second Street, New York, is planning two new manufacturing and distributing plants, to cost more than $150,000 with equipment.

Isaacson Iron Works, 2917 East Marginal Way, Seattle, manufacturer of automobile bodies and other metal products, is planning extensions to cost more than $90,000 with equipment.

Puget Sound Power & Light Co., Seattle, is arranging an expansion program to cost more than $10,000,000, and about three times that sum within the next three to four years. Present work will include new steam-operated electric power plant to cost over $3,500,000 with transmission lines. Company is under direction of Engineers Public Service Co., an interest of Stone & Webster, Inc., 49 Federal Street, Boston.

Scenic Airway, Inc., Phoenix, Ariz., Parker Van Zandt, general manager, is planning construction of local airport, to include hangars, repair shops and other buildings, to cost $140,000.

Ace Heating & Ventilating Co., 5805 Angeles Mesa Drive, Los Angeles, has been organized to design and manufacture heating, ventilating and refrigeration equipment, specializing in theater, auditorium, school and assembly halls. Company does not maintain manufacturing facilities at present, but expects to arrange for this later. Equipment manufactured for its use is handled on jobbing basis.

Broderick & Bascom Wire Rope Co., St. Louis, will erect a new building, 100 x 100 ft., at Eighteenth and Upshur Streets, Portland, Ore., to take care of its Pacific Coast trade.

Byron Jackson Pump Co., Berkeley, Cal., has established a direct factory branch at 1104 Buyers Building, Portland, in charge of A. P. DuMond. Associated with him is A. H. Marshall, consulting engineer.

Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, has removed its Los Angeles branch office and service station to larger quarters at 1220 Hope Street.

Milwaukee

MILWAUKEE, Dec. 3.—Following an excellent run of business in November, which sets the month apart as probably the best the local machine tool industry has experienced since the war, December has opened with bright prospects and the character and volume of inquiry denote a continuance of active demand. In some instances tool builders are falling farther behind in deliveries, despite efforts to keep production abreast of shipping specifications.

Allis-Chalmers Mfg. Co., Milwaukee, has placed contract with W. W. Oeflein, Inc., 110 East Wisconsin Avenue, for a brick and steel foundry, 144 x 130 ft., and a new heat treating shop 50 x 120 ft., as extensions of tractor plant at main works in West Allis. Estimates also have been closed on a manufacturing building, 200 x 600 ft., for this division. Extensions will also be made to Monarch tractor plant at Springfield, Ill. Purchase of equipment has been under way for some time.

Hackendahl & Schmidt Co., Milwaukee, fabricator of structural and architectural iron, will begin work this month on erection of a one-story storage building, 100 x 240 ft. It will have a 60-ft. craneway and two 20-ft. lean-tos.

J. I. Case Threshing Machine Co., 700 State Street, Racine, Wis., is taking bids through Frank J. Hoffman, architect, Janes Block, Racine, for an extension of about 10,000 sq. ft. to its branch plant at Lincoln, Neb. Investment in building and equipment will be about $35,000.

In addition to extensions to heat treating shop, power plant and other enlargements by Nash Motors Co., Kenosha, Wis., to its branch works at Racine, Wis., contracts have been placed for a new shear building, 28 x 41 ft. About $600,000 is being expended for structures and equipment.

Board of Vocational Education, La-Crosse, Wis., has been granted a 1929 budget appropriation of $52,500 for completion of second story of present building and purchase of equipment. Work is expected to materialize about Feb. 1. G. M. Wiley is secretary of board.

Board of Industrial Education, Racine, Wis., has been authorized an appropriation of $40,630 for new construction and equipment for Racine Vocational School, available Jan. 1.

Milwaukee Corrugating Co., Milwaukee, has acquired Eller Mfg. Co., Canton, Ohio, which operates a plant 280 x 300 ft. Consolidation will serve as a production and distributing section for Milwaukee company in East and South. Line of products will now include metal lath, corner bead, channels, ceilings, stove pipe, furnace pipe and other types of conductor pipe, and furnace and stove pipe elbows.

Canada

TORONTO, Dec. 3.—Machine tool sales continue in good volume. Reports indicate that November business compared favorably with any former month this year. Inquiries are coming in steadily and dealers and builders are optimistic regarding the future.

Kilgour Chair Co., Ltd., Coaticook, Que., has awarded several contracts for erection of a plant to cost $80,000. Buildings will be one story, 80 x 400 ft.; 20 x 50 ft., and 56 x 109 ft. The Stewart Construction Co., Ltd., 12 Wellington Street North, Sherbrooke, Que., is contractor.

Canadian Drawn Steel Co., Ltd., Gerrard Street, Hamilton, Ont., has awarded general contract to Frid Construction Co., Ltd., 6 Hughson Street North, for an addition to cost $25,000.

A number of sub-trades have been let for a $200,000 plant and office building at New Toronto, Ont., for Ritchie Cut Stone Co., Ltd.

Cunningham & Son, Ltd., St. Paul Street, St. Catharines, Ont., manufacturer of castings, will make alterations and additions to plant, and has awarded general contract to P. Teatero & Son, 112 Louisa Street.

Walbridge Aldinger Co., 2306 Penobscot Bldg., Detroit, has been awarded contract for superstructure of $1,500,000 addition to plant of Chrysler Motor Co., Walkerville, Ont., building to be three stories, 380 x 1000 ft. Hutton & Souter, 6 James Street North, Hamilton, Ont., are architects.

S. E. Dinsmore Co., Ltd., Security Building, Windsor, Ont., has been awarded contract for a $60,000 addition to plant of Auto Specialties Mfg. Co. of Canada, Ltd., Windsor, Ont.

Tenders will be called soon for a 2,000,000-bu. addition to grain elevator of Midland Simcoe Elevator Co., Ltd., Midland, Ont., to cost about $500,000. C. D. Howe & Co., 712 Whalen Building, Port Arthur, Ont., are architects.

National Utilities Corporation, Winnipeg, Man., purposes to build plants at Port Arthur and Fort William, Ont., to manufacture gas and heating units. Each plant will cost about $750,000.

Western Canada

Western Steel Products, Ltd., Edmonton, Alta., will build a one story addition, 80 x 190 ft., to cost $50,000.

John Deere Plow Co., head office, Moline, Ill., is having plans prepared for a warehouse and service plant at Swift Current, Sask., tenders for construction to be called next spring.

Foreign

AN expansion and development program in Brazil will be carried out by Electric Bond & Share Co., 2 Rector Street, New York, through its subsidiary, American & Foreign Power Corporation, to cost over $20,000,000, including purchase of properties, extensions in power plants, transmission lines and other facilities. Company has recently acquired Pernambuco Tramway Co., Pernambuco, and Tramway, Light & Power Co. of Natal, State of Rio Grande del Norte, Brazil.

Goodyear Tire & Rubber Co., Akron, Ohio, has begun construction of new unit at plant at Sydney, Australia, to cost more than $300,000 including equipment.

Ministry of Public Works, Prague, Czechoslovakia, has plans for construction of power dam at Vranov, on River Dyje, in Moravia, to cost about 87,000,000 crowns ($2,558,823), providing water head for hydroelectric power station, to be built at same time to cost approximately 25,000,000 crowns (about $735,300).

Ford Motor Co., Detroit, has concluded agreement with Turkish Government, Constantinople, for establishment of assembling plant in that country. It is purposed to take over existing property for initial works and later to construct entirely new plant. It will be used as export base for Near East for passenger cars, trucks, tractors and aircraft.

Soviet Russian Government, Petrograd, is planning construction of factory to manufacture watches and clocks, including mechanisms, cases, etc. A delegation has left to visit such plants in western Europe and will arrange for details of project. Amtorg Trading Corporation, 165 Broadway, New York, is official buying agency for Soviet Government in United States.

A company is being organized at Trinidad, British West Indies, to construct an artificial gas plant and system for Island of Trinidad. It is expected that there will be selection of American gas works machinery for project. Information at office of Bureau of Foreign and Domestic Commerce, reference Trinidad No. 293026.

Industrial Wages at Higher Level

Analysis of employment and wage conditions among 800,000 workers in 1500 manufacturing establishments by the National Industrial Conference Board, New York, discloses that the real incomes of industrial wage earners this fall have reached their highest level since the inflation of 1920. Outstanding in the situation is the marked stability of wage rates and of earnings. Since 1923 these have fluctuated less than 5 per cent.

During the past year the highest figure for hourly earnings was 234, in September, and the lowest, 231, in February and May, both being based on 100 as the average of July, 1914. Weekly earnings during 12 months had a maximum of 221 in September, 1928, and a minimum of 213 in November, 1927. Employment in September was more than 6 per cent above the low point reached in November, 1927. Total hours worked in September were 10.8 per cent higher than in November of last year.

Canadian Output Gained in October

TORONTO, ONT., Nov. 30.—Production of pig iron in Canada in October amounted to 93,186 gross tons, a 3 per cent gain over the 90,516 tons made in the previous month and more than double the 38,097 tons produced in October, 1927. Compared with September, when the output of basic iron reached 57,424 tons, October output showed a considerable gain with a total of 65,625 tons; malleable iron rose from 11,800 tons in September to 13,622 tons in October; foundry iron, of which the production was 21,292 tons in September, declined to 13,739 tons in October. The decline in the output of foundry iron, however, had no bearing on sales or shipments to melters as there are still large tonnages of this grade of iron piled for immediate delivery to consumers.

For the 10 months ended Oct. 31, the production of pig iron in Canada was 838,659 gross tons, an increase of 38 per cent over the 608,511 tons produced during the corresponding period of 1927, which in turn was 4 per cent under the 631,187 tons produced in the 10 months of 1926. This year's blast furnace production included 591,274 tons of basic iron; 174,715 tons of foundry iron and 72,760 tons of malleable iron.

The number of furnaces in blast at the end of October remained the same as on Sept. 30.

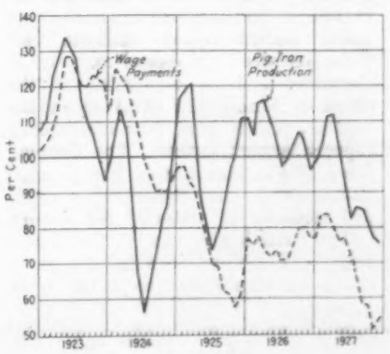
Production of ferroalloys in Canada in October at 2127 tons showed a slight increase over the 2008 tons reported for September. The total for 10 months was 35,541 tons, compared with 47,649 tons in the corresponding period of 1927.

Production of steel ingots and castings during October at 108,987 tons was 9 per cent over the output of 99,888 tons in September and almost double the total of 56,371 tons produced in October last year. For the 10 months ended with October the production of steel ingots and direct steel castings totaled 1,028,697 gross tons, or an increase of 41 per cent over the 730,660 tons produced in the corresponding 10 months of 1927, which in turn was 9 per cent greater than the 664,084 tons for 1926.

Related Wage Payments to Pig Iron Production

Wage payments in blast furnace plants in Pennsylvania have declined 57 per cent from the peak reached in 1923 and early 1924, according to figures gathered by the Department of Labor and Industry of the Commonwealth of Pennsylvania. Along with this decline in payrolls there has been a similar but less pronounced decline in the production of pig iron in the State, this having shown a drop of 43 per cent to the end of 1927. "The relatively greater decline in payrolls does not reflect lower wages," says the report, "since employment has decreased to a like extent; but appears to indicate greatly increased output per worker."

There is a wide divergence between the evidence in the chart shown and



Comparison of Payrolls with Pig Iron Shows How Output per Worker Has Increased

that for other industries in the State. Practically without exception, the others have shown a reasonable parallelism beween wages and production. Evidently the drastic cost-cutting effort which has been carried through so successfully by the iron and steel industry has not been so large a feature in other industries included in the survey.

Larger Tonnage of Steel Ships

WASHINGTON, Nov. 30.—On Nov. 1 American shipyards were building, or were under contract to build, for private shipowners 423 steel vessels of 223,566 tons gross register. This compares with 433 steel vessels of 205,820 gross tons on Oct. 1, according to the bureau of navigation, Department of Commerce.

Year's Ore Shipments 5 Per Cent Over 1927

CLEVELAND, Dec. 3.—Shipments of Lake Superior ore by water during 1928 amounted to 53,980,874 gross tons, a gain of 5.6 per cent, or 2,873,738 tons, over the movement of 51,107,136 tons in 1927. Shipments in 1926 were 58,537,855 tons. In 1925 they were 54,081,298 tons, or approximately the same as this year.

Water shipments in November were 4,260,942 tons, or more than twice the amount shipped in November, last year. With the absence of severe November storms, weather conditions were fairly good for shipping ore during the month and shippers kept up so well with their schedules that few cargoes were moved during the last week of November. Usually in previous years a few cargoes were shipped in December, although in 1927 the last cargo started down the lakes before the end of November.

All-rail shipments this year are expected to run slightly below those of last year, when the all-rail movement amounted to 1,236,200 tons. The combined water and all-rail shipments this season will run somewhat over 55,000,000 tons.

Shipments by ports for November, for the entire year and for 1927, and total water shipments for ten years are listed below:

Lake Ore Shipments by Water, Gross Tons

	November	Season 1928	Season 1927
Escanaba	551,836	5,487,556	5,865,224
Marquette	309,170	3,410,902	3,238,855
Ashland	525,443	6,481,158	6,239,774
Superior	1,120,011	15,413,694	14,627,936
Duluth	1,360,247	17,454,063	15,432,188
Two Harbors	394,235	5,733,501	5,703,159
Total	4,260,942	53,980,874	51,107,136
1928 increase			2,873,738

Water Shipments of Last Ten Years, Gross Tons

1919...	47,177,395	1924...	42,623,572
1920...	58,527,226	1925...	54,081,298
1921...	22,300,726	1926...	58,537,855
1922...	42,613,229	1927...	51,107,136
1923...	59,036,705	1928...	53,980,874

Totaling 116,951, applications received by the United States Patent Office during the last fiscal year set a record and exceeded by 3168 the number received the previous fiscal year, according to the annual report of Commissioner Thomas E. Robertson. The commissioner repeated prior statements to the effect that the work of the Patent Office is seriously hampered because of the insufficient number of technical examiners.

Farm implement production during the first nine months of 1928 as reported by 74 companies in the United States was 28.8 per cent above the corresponding period of 1927, according to a report by the Federal Reserve Bank of Chicago. The sales of threshers, tractors and combines increased 38.4 per cent. Purchases of light equipment and of barn equipment gained 6.2 per cent and 6.3 per cent, respectively.

Lockout By German Mills Terminated

Employers and Unions Agree to Arbitration — Increased Shipbuilding Expected to Aid British Steel Industry

(*By Cable*)

LONDON, ENGLAND, Dec. 3.

THE pig iron market is quiet, but the outlook is regarded more favorably as the Government derating plan, effective from Dec. 1, should bring a considerable reduction in costs of production. Consumers are expecting to benefit by the plan, but Cleveland producers are still firm in their quotations.

Hematite iron is stronger as a result of restricted output, but export buyers are not inclined to follow the rise in prices and makers are accepting 6d. to 1s. (12c. to 24c.) per ton less for such business. Foreign ore continues quiet.

New shipbuilding is improving. Clyde orders for November totalled 100,000 tons. The Clyde output in November was 12 vessels of 56,600 tons. Steel makers are expecting to benefit by the new shipbuilding contracts, but the heavy plants are at present in decided need of tonnage.

The British Southern Railway has placed an order with British makers for 5000 tons of steel sleepers, which is the first contract of this nature placed here for British railroad use.

Tin plate inquiry is improving with the tin market strong, but business is still inactive, mills needing orders for December. Some mills have begun their agreed period of idleness although most are well booked for delivery early next year.

Galvanized sheets are active in small lots. Black sheets are quiet except for some sales of heavy gages to Japan.

The Ruhr lockout is ended and work is being resumed, both parties having agreed to a settlement by Government arbitration. The steel market is consequently easier with sellers actively seeking orders. Some inquiry for semi-finished material is in the market from British users, but business is otherwise quiet.

The German output in October was 1,016,000 tons of pig iron, 1,306,000 tons of raw steel and 1,032,000 tons of rolled steel products. The Saar production in October was 169,000 tons of pig iron and 190,000 tons of raw steel. Luxemburg's production in October was 236,000 tons of pig iron and 229,000 tons of raw steel.

British Steel Mills Seek Tonnage

German Lockout Brings No Increase in Orders—Pig Iron Improves—Tariff Advocates Active

LONDON, ENGLAND, Nov. 23.—Although three weeks have passed since the German lockout began, British producers are still awaiting the increased volume of orders that was expected to be diverted from German mills. Recent reports indicate that there are sizable stocks of material in Germany and, as a number of the finishing mills are involved in the lockout, it has been found necessary to seek export outlets. The German Steel Works Association has granted authority for the release of a specified tonnage of material for export.

The British pig iron market is still active. Cleveland iron is once more becoming established as a factor in foreign markets, and domestic demand is also improving. Stocks are small, and more furnaces are going into blast. Statistics in the *Labour Gazette* show that employment at blast furnaces in October gained 3.7 per cent, although remaining 7.9 per cent below average employment for the year. Employment in the finishing mills continues unsatisfactory, having registered a further decline of 2.3 per cent in October. The total for that month, however, was 2 per cent above the average for the year.

Advocates of protection are still urging that iron and steel be included in the Safeguarding of Industries Act, but the Prime Minister has re-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at $4.86 per £ as follows:

Durham coke, del'd	£0 17½s.			$4.25		
Bilbao Rubio ore*	1 2	to £1	2½s.	5.35	to	$5.48
Cleveland No. 1 foundry	3 8½	to 3	9½	16.64	to	16.89
Cleveland No. 3 foundry	3 6			16.04		
Cleveland No. 4 foundry	3 5			15.80		
Cleveland No. 4 forge	3 4½			15.68		
Cleveland basic (nom.)	3 5			15.80		
East Coast mixed	3 10	to 3	11	17.01	to	17.25
East Coast hematite	3 10½	to 3	11½	17.13	to	17.37
Rails, 60 lb. and up	7 15	to 8	5	37.66	to	40.10
Billets	6 5	to 6	10	30.37	to	31.59
Ferromanganese	13 15			66.83		
Ferromanganese (export)	14 0			68.04		
Sheet and tin plate bars, Welsh	6 0			29.16		
Tin plate, base box	0 18	to 0	18¼	4.37	to	4.40
Black sheets, Japanese specifications	13 7½			65.00		
				C. per Lb.		
Ship plates	7 12½	to 8	2½	1.63	to	1.74
Boiler plates	9 0	to 10	10	1.92	to	2.25
Tees	8 2½	to 8	12½	1.74	to	1.84
Channels	7 7½	to 7	17½	1.58	to	1.69
Beams	7 2½	to 7	12½	1.53	to	1.63
Round bars, ¾ to 3 in.	7 10	to 8	0	1.62	to	1.69
Steel hoops	9 0	to 10	0	1.92	to	2.14
Black sheets, 24 gage	10 0			2.14		
Galv. sheets, 24 gage	13 10	to 13	15	2.93	to	2.98
Cold rolled steel strip, 20 gage (nom.)	16 0			3.42		

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):						
Belgium	£3 3s.	to £3	5s.	$15.31	to	$15.80
France	3 3	to 3	5	15.31	to	15.80
Luxemburg	3 3	to 3	5	15.31	to	15.80
Basic pig iron (a):						
Belgium	3 5	to 3	6	15.80	to	16.04
France	3 5	to 3	6	15.80	to	16.04
Luxemburg	3 5	to 3	6	15.80	to	16.04
Coke	0 18			4.37		
Billets:						
Belgium	5 2			24.78		
France	5 2			24.78		
Merchant bars:				C. per Lb.		
Belgium	6 3½			1.36		
France	6 3½			1.36		
Luxemburg	6 3½			1.36		
Joists (beams):						
Belgium	5 3			1.14		
France	5 3			1.14		
Luxemburg	5 3			1.14		
Angles:						
Belgium	6 2½			1.35		
¼-in. plate:						
Belgium (a)	6 12½			1.45		
Germany (a)	6 12½			1.45		
⅜-in. ship plate:						
Belgium	6 7½			1.39		
Luxemburg	6 7½			1.39		
Sheets, heavy:						
Belgium	6 1			1.33		
Germany	6 1			1.33		

(a) Nominal.

affirmed his previous statements that no further steps in that direction will be taken during the existence of the present Parliament. It is apparent, however, that the safeguarding of iron and steel will be one of the important issues in the coming general election.

As a whole, the steel industry is not prosperous, although certain branches show improvement. Business in galvanized sheets is better, and mills producing light materials are more active. Tin plate mills are well booked with business for delivery during the early part of the coming year, but have insufficient tonnage for current operations. The heavy rolling mills are still in need of orders. A number of shipbuilding contracts have been awarded to British yards, but it will be some time before the orders for material for these ships are actually placed. Export business is poor, but should the German lockout be prolonged, it is believed that Dutch and other Continental shipyards will turn to British mills for their requirements.

German Lockout Had Less Effect Than Expected

(*By Radiogram*)

BERLIN, GERMANY, Dec. 3.

LOCKOUT of steel workers in the Rhenish and Westphalian districts has been terminated.

Domestic prices of the syndicates for pig iron, semi-finished steel and rolled materials are unchanged. The ingot steel syndicate's price rebates to exporting manufacturers are unchanged for December.

Home markets are quiet. There is no shortage of materials, except for semi-finished products locally. Export prices in the past few days have been weaker. Steel bars are down to £6 a metric ton (1.32c. a lb.), f.o.b., and further weakening is expected.

There is a shortage of bands and wire products for export, but the effect of the lockout on steel exports generally has been less than was anticipated. It will take a week or two to resume full production in the lockout area, where the works have orders ahead for from six to eight weeks.

No Central German Lockout —Other Plants Close

HAMBURG, GERMANY, Nov. 17.—The demand of workmen in steel mills of central Germany for an increase in wages has been withdrawn, and there will be no lockout at these plants on Dec. 1. Central German works produce about 50,000 tons of pig iron and 55,000 tons of rolled products a month. This decision has influenced the metal workers in Saxony, who will not present demands for wage increases when their present agreement expires.

The lockout in northwestern Germany, which began Nov. 1, will extend to western Westphalian producers of wire, bolts, rivets and general hardware. This district contributes about 34 per cent of the wire, 67 per cent of the bolts and nuts and 52 per cent of the rivets made in Germany. The workmen at these plants have refused to extend their present wage agreement after Dec. 1, and the employers have announced a lockout, effective Nov. 30.

Opposition to Cartels Grows

Large German Steel Mill Advocates Open Competition—International Steel Scrap Syndicate Suggested

HAMBURG, GERMANY, Nov. 17.—Recent reports state that Gutehoffnungshütte A. G., Oberhausen, Rhine, one of the largest German steel producers, is to enter into active opposition to the present cartels and associations in Germany. It is pointed out that the German and international cartels have not brought about the expected results, and that Government interference has operated against their success in Germany. A return to open competition is urged, with loose agreements to prevent disastrous price cutting. It is suggested that open competition for business, especially in the export field, would be preferable to the present operation through cartels and syndicates organized in their present form.

Despite opposition to cartels, it is said that negotiations in the interests of a steel scrap syndicate have been initiated by the Grangesborg A. G., which controls the iron ore production of Sweden and most of the North African mines. This company is reported to have proposed a combination of French, Belgian and German iron and steel scrap merchants with a view to controlling the scrap market.

The recently formed international tube, strip and hoop steel cartel has begun to quote export prices, but a large available supply in the hands of merchants and need for tonnage on the part of non-member mills is bringing out lower prices. The official quotation of £6 10s. ($31.59) per ton for 2-in. and £6 5s. ($30.38) for 2-in. to 8-in. tube strips is shaded 1s. to 2s. (24c. to 48c.) per ton by non-members and merchants.

Japanese Prices Are Lower

Increased Value of Yen Causes Price Reductions—Large Wire Rod Consumer Temporarily Suspends

THE October report of A. Cameron & Co., Kobe, Japan, on conditions in the Japanese iron and steel market, states that imports of black sheets in September showed an increase of 3270 tons compared with the previous month. Of total arrivals of 21,347 tons of black sheets at Kobe, Yokohama and Osaka, Britain furnished 12,614 tons, the United States 6507 tons, Germany 2096 tons, Sweden 5 tons, and all other countries 125 tons. As a result of the increased importation of black sheets the quotations of merchants declined from 72.50 sen (33.21c.) per sheet to 71 sen (32.52c.) per sheet for the American product, and from 71.50 sen (32.75c.) per sheet to 70 sen (32.07c.) for British sheets. For the first half of October the domestic producer of sheets, the Kawasaki Dockyard Co., reduced its price 50 sen (23c.) per ton and for the second half 1 yen (45.81c.) per ton. The domestic price for January delivery is 193 yen ($88.41) per ton.

Throughout October tin plate was quiet and prices developed considerable weakness as the month advanced, being affected by recovery of the yen in foreign exchange, which forced small holders to dump their stocks on the market. The highest price paid during the month for British tin plate was 20.50 yen ($9.39) per box of 170 lb. and the lowest price was 19.20 yen ($8.80) per 170-lb. box, which was less than the cost of replacement. The price for American tin plate in 170-lb. boxes ranged from 22 yen ($10.08) early in the month to 21 yen ($9.62) at the end of October.

The wire rod market was weak during the month as a result of continued heavy arrivals of rods from European mills. Quotations were about 105 yen ($48.10) per ton early in the month, declining to a low point of 95 yen ($45.23) by Nov. 1. A factor in this decline of prices was the suspension of a large wire mill in the Osaka district, which closed temporarily following an altercation with the Daiki Electric Railway Co., its source of power supply. This mill consumes about 1500 tons of wire rods a month.

More Steel Houses in Germany

HAMBURG, GERMANY, Nov. 17.—Construction of steel dwellings in Germany is increasing. The city of Düsseldorf, which contracted for 162 such houses last spring, has placed new orders for 82 of the same design and 246 of three other designs, to be erected next spring. Other cities in Germany have ordered 1000 steel dwellings since Oct. 1.

Our Foreign Trade Expansion Aids Europe

Dr. Julius Klein of Department of Commerce Says Our Purchases Have Supplied Buying Power Abroad

WASHINGTON, Dec. 4.—The post-war expansion of American trade has helped, not hindered, the recovery of Europe, it was pointed out in a joint annual report on general progress and tendencies in foreign trade made by Dr. Julius Klein, director, and E. Dana Durand, chief of the Division of Statistical Research, Bureau of Foreign and Domestic Commerce, Department of Commerce. Imports, it was declared, have grown more than exports and the immense increase in American purchases abroad has created a buying power in the supplying countries, both for American exports and for those of other industrial countries, that would not have otherwise existed. Moreover, it was stated, the growth of American exports has made possible large investments of American capital in foreign countries. European production was declared to have been stimulated by such investments in Europe itself, and markets for European goods in other continents have been stimulated by the greater buying power resulting from increased production brought by American investments in those continents.

"It is true, of course," it was stated, "that the United States has a larger share of world trade than before the war. This is a natural result of the growth of our productive capacity, but little checked by the war, while the productive capacity of Europe was enormously cut down. Our export trade has simply continued its normal growth, and even somewhat less rapidly than would have been the case had there been no war to reduce world-buying power. The concentration of all Europe's efforts on war needs brought its export capacity to a small fraction of its normal volume, and marked as has been the recent recovery it is but natural that European exports should still be less quantitatively than before the war."

Despite the growth of its factories, it was pointed out, the United States is importing more manufactured goods from Europe than ever before. The exports of the leading countries of Europe to the United States were declared to have increased much more, as compared with pre-war years, than their exports to the rest of the world. In the case of practically every non-European country, the report said, its exports to the United States have also grown far more as compared with pre-war years than its exports to all other countries combined. The buying power of this country resulting from its prosperity was said to have made up for the decline in demand resulting from the reduced buying power of Europe.

While declaring that the future of American export trade cannot, of course, be predicted with any certainty, the report pointed out that indications are strong that the tendencies of the last few years will continue "and that we shall witness further large expansion of our sales abroad, particularly of manufactured products, and further large increase of our imports." The report added that the most important point is that, so long as peace is maintained in the world, total world buying power tends to expand steadily. While competition in international commerce in manufactured goods was very vigorous prior to the World War, said the report, it did not prevent the expansion of the trade of every industrial country. At the same time that the United States and Germany, newer competitors in factory industry, were rapidly adding to their exportation of manufactured goods, it was pointed out, England, the pioneer in that field, was still expanding its sales abroad.

"Now that peace has come again the same factors which are building up productive capacity and raising living standards in the United States are again at work all over the world," it was declared.

Pig Iron Imports Above Last Year

WASHINGTON, Nov. 30.—Imports of pig iron into the United States continue to be comparatively small, having totaled only 14,108 tons in October. This, however, was an increase of 3671 tons over the figure for September. For the 10 months ended with October pig iron imports aggregated 118,885 tons, against 102,127 tons for the corresponding period of last year, an increase of 16,758 tons.

Great Britain was the leading source of these imports for both October and the 10 months of the present year, incoming shipments from that country having been 7702 tons and 47,254 tons respectively. British India ranked second, supplying 4610 tons and 42,637 tons respectively.

Germany has sent no pig iron to the United States since July, when the movement from that country was 300 tons. The total incoming shipments from Germany for the 10 months ended with October was only 395 tons, erroneously stated as 95 tons previously. The action of the Treasury Department in revoking the anti-dumping order directed against German pig iron imports is not expected to have any appreciable effect on shipments from that country. Costs of making pig iron in Germany have risen to a point where, it is said, they are practically as great as those in the United States.

New York District Leads Airplane Industry

The Merchants' Association of New York, through its industrial bureau, has completed a survey of the airplane industry, and reports that the New York metropolitan district leads all other sections of the country in the manufacture of airplanes and accessories. In 1927, the companies in the New York district turned out 29 per cent of the total production of the country. Buffalo was second, Detroit third and Los Angeles fourth. Copies of the report will be available for distribution in about two weeks.

Ohio Power Plant Buys German Engines

HAMBURG, GERMANY, Nov. 17.—The Borsig G.m.b.H., Berlin, has confirmed the recent report that it has booked an order from the International Combustion Engineering Corporation, New York, for equipment to be installed in a power station at Lockland, Ohio. Included in the order are two vertical 6000-hp., direct acting, triple expansion steam engines, among the largest of their type.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	October		Ten Months Ended October	
	1928	1927	1928	1927
United Kingdom	7,702	190	47,254	15,215
British India	4,610	5,196	42,637	49,338
Germany	....	....	395	8,871
Netherlands	896	2,260	22,728	23,047
Canada	162	....	540	689
France	30	500	330	3,000
Belgium	20	....	222	699
Norway	280	....	955	....
All others	408	32	3,824	1,268
Total	14,108	8,178	118,885	102,127